DISSERTATION ON DROWNING:

IN WHICH

SUBMERSION, commonly call'd DROWNING, is ſhewn to be a long Time conſiſtent with the Continuance of LIFE, from a Variety of unexceptionable tho' ſurpriſing FACTS, related by the moſt eminent and judicious Authors, and confirm'd by inconteſtable Evidence; which FACTS are reconcil'd and accounted for, from the ſtricteſt Laws of the Animal Oeconomy.

To which is SUBJOINED,

The proper Meaſures for RECOVERY and RELIEF; the Obligations we lie under to practiſe them are clearly ſuggeſted, and ſtrongly enforced; intended for the Good of Mankind, by reſtoring Life to many Perſons, who are erroneouſly ſuppoſed to be irretrievably drowned. Recommended particularly, to the Conſideration of the Surgeons of the Navy and Army, who have frequent Opportunities of practiſing the Methods recommended.

With an APPENDIX, containing ſome METHODS for the Recovery of thoſe who hang themſelves, and of Children ſuppoſed to be born dead.

By a PHYSICIAN.

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M DCC XLVII.

BRITISH MUSEUM

A

DISSERTATION

ON THE

Recovery of PERSONS drown'd.

AS Truth in general is of the laſt Importance, not only in affording a noble and exalted Satisfaction to the Mind, but alſo in forming the Morals, and, by that Means, promoting the moſt valuable Intereſts of Society; ſo nothing can be a greater Reproach to Reaſon, nor a more palpable Affront offered to its auguſt and venerable Author, than that ignoble and unmanly Turn of Mind, commonly known by the Name of *Credulity*, which is no more than an implicit Contempt of Reaſon, and all the mental Powers, producing a Propenſity to believe certain Tenets, Doctrines, or Facts, without that Degree of Evidence, which a Mind ſtudious of Truth ought to require.

But however odious *Credulity* may appear, when painted in her native Colours, ſhe is nevertheleſs,

If we may be allowed the Expreſſion, a *Spectre*, which haunts the various Claſſes and Diſtinctions of Mankind, under a Form ſo infatuating and alluring, as to ſeduce them from the plain and amiable Paths of Truth, and bewilder them in the dark and gloomy Labyrinths of Ignorance, Error, and Confuſion. This deplorable Obſervation is in no Inſtance more effectually verified, than in theſe very Men, who profeſs a ſacred Veneration for Reaſon, and pretend to go wherever Truth ſhall conduct them; for, we frequently find, not only antient, but alſo modern Philoſophers and Phyſicians, labouring with a pompous Shew of Learning and Ratiocination, to prove that Nature, by her ſtated and eſtabliſhed Laws, was capable of producing certain Effects, which Time has afterwards diſcovered never to have had any Exiſtence, except in the Imaginations of the Credulous, or in the chimerical Works of Authors, who, forſaking Fact and Nature, have given a full Scope to their Fancy and Invention. Thus in former Ages it was keenly diſputed, how it came about, that a ſmall Fiſh, called the *Remora*, was capable of putting a ſpeedy Stop to a Ship under Full-ſail; but this pretended Fact has, by later and more penetrating Naturaliſts, been diſcovered to be abſolutely falſe. And, no doubt, the ever memorable Rabbit-Woman of *Godalmin* would have made a conſiderable Figure in the Annals of the *Royal Society*, and afforded Matter to the Members for copious Diſſertations on the Force of Imagination, if ſhe had prudently ceaſed Breeding a Day ſooner. This bad Piece of Conduct, has, however, thrown an almoſt irreparable Diſgrace upon *natural Knowledge*, by inducing the ſober and judicious Part of Mankind to imagine, that it was totally employ'd

in

in explaining Viſions and Chimeras: Therefore, if we intend to philoſophiſe in ſuch a Manner as not to diſgrace Philoſophy, we muſt have Facts duly aſcertained, before we attempt to explain and account for them; ſince, according to *Kercher*, in his *Mund. Subterran.* Lib. 10. "'Tis as abſurd "in phyſical Matters, to philoſophiſe without "Experience, as it is for a blind Man to pretend "to judge of Colours."

Tho', from what has been ſaid, it ſufficiently appears, that *Credulity* is fatal to Truth, yet we obſerve in the Minds of ſome Men an arrogant and preſumptuous *Scepticiſm*, which, admitting nothing but what is eaſy to the Conception of its Poſſeſſors, is no leſs prejudicial to the genuine Intereſt of Science, and Philoſophy; for, as, by the former we are expoſed to the Danger of adopting Error as well as Truth; ſo by the latter our Minds are, as it were, manacled, and hindered from giving a rational Aſſent to Things and Facts cloathed with the moſt ſtriking and diſtinguiſhed Characters of Evidence, for no other Reaſon, than that we cannot comprehend them. It is, for Inſtance, a culpable Diffidence, to diſbelieve the Poſſibility of a Perſon's retaining a latent Principle of Life, after he has remained ſome Hours, Days, and even Weeks under Water, ſince numerous Facts, related by the beſt Authors, vouched by the moſt candid Witneſſes, and recorded in the publick Archives of the moſt penetrating and ſagacious Nations, concur to remove the ſmalleſt Remains of Uncertainty in this Point. Beſides, I would have the Gentlemen of this Claſs remember, that their Conduct beſpeaks an inſupportable Degree of Pride, and amounts to a formal Declaration, that they themſelves are bleſſed with Geniuſes far ſuperior to others, ſince nothing can

be true, but what is comprehenſible by the vaſt Extent of their Capacities. And tho' Modeſty and Common-Senſe ſhould not direct them to this Obſervation, yet what the World calls *moral Evidence* ſtands upon Foundations, too ſtable and ſure to be ſhaken by their frivolous Conceits, or ill-grounded Remonſtrances. In a Word, the wiſe and thinking Part of Mankind will always be induced to give their Aſſent to Facts ſeen by a ſufficient Number of Witneſſes, who have Senſe enough to guard againſt Impoſture themſelves, and Honeſty enough to ſay nothing but what is Truth to their Neighbours. All theſe advantageous Circumſtances attend the following Narrations, which, for the common Benefit of Mankind, have been collected from Authors of the greateſt Veracity, in order to ſhew, that there is often a Poſſibility of reſtoring drowned Perſons to Life, after vulgar Prejudice, and a Want of ſufficiently extenſive Views with Reſpect to the Laws of the animal Oeconomy, have laid a Foundation for concluding them irretrieveably dead, and paſt all Hopes of Recovery.

Dr. *Bruhier*, an eminent Phyſician of *Paris*. well known to the learned World, and highly eſteemed for his Knowledge in his Profeſſion, about three Years ago, publiſhed a Treatiſe on the *Uncertain Signs of Death*, tending to prove, that many People are interred before they are really dead; and that there are frequent Inſtances of Perſons who have lived many Days without Reſpiration, or any other apparent Signs of Life. This Doctrine he eſtabliſhes by many inconteſtable Hiſtories of People who have actually ſurvived their Funerals, and lived many Years after they had been buried, upon a Suppoſition, that they were actually dead. Hence he very judiciouſly infers,

that

that 'tis not imprudent but inhuman, to suffer the Interment of our Friends and Relations, before we are convinc'd from the most evident Marks, that they are certainly and irrecoverably deceas'd; or till such time as the Beginning of Putrefaction convinces us, that no Hopes remain of a Revival.

In Confirmation of what this celebrated Physician has advanc'd, many Examples might be found in our own Country, which escap'd his Researches; and no doubt it happens much more frequently, than is generally imagin'd; especially in hysterical Women, in those who have contracted a Habit of drinking spirituous Liquors to Excess, but particularly in those who have been guilty (for so I can't forbear calling it) of taking frequent Doses of Opium, or its Preparations, so as to render Life insupportable without them, of which there are too many Instances.

This Doctrine, however true, is not altogether modern; for we learn from *Diogenes Laertius*, that the celebrated *Empedocles* acquir'd uncommon Honour, by restoring a Woman to Life who was thought to be dead many Days, and whose Disorder he discover'd to be only a Strangulation of the Uterus, that is, an hysteric Fit.

We learn, farther, that *Heraclides* of *Pontus*, a noted Philosopher, wrote a Treatise upon this very Subject, which he intitled, Περὶ τῦ ἄπνυ, *Of the Distemper in which the Patient is depriv'd of Respiration.* In this he asserted, that the Disorder might continue thirty Days, during which there was no Respiration, or any other Signs of Life, without any Marks of Putrefaction; and that notwithstanding, the Patient might at last recover.

In Consequence of the frequent Interments of People before they were really dead, Dr. *Bruhier*,

in

1745, publiſh'd a ſmall Pamphlet, containing Propoſals for the Regulation of Funerals, and the Prevention of ſuch calamitous Diſaſters; which he endeavours to have co firm'd by the Legiſlature; for, ſays he, how many Women weary of their Huſbands, and Huſbands equally weary of their Wives; how many Children who have either a real or an imaginary Reaſon to be diſſatisfied with their Parents; and, eſpecially, how many covetous and neceſſitous Heirs, who have long waited for the happy Moment, which was to put them in Poſſeſſion of an opulent Fortune, may not abuſe the Liberty the Law affords them of burying their Friends at the End of twenty-four Hours, at which Time they may, poſſibly, be really alive, and capable of a Recovery. And, to prove this Regulation the more neceſſary, he relates the following Hiſtories.

A Woman about eighty Years old, being taken for dead, was about to be laid out as ſuch, when a Perſon, who had perus'd his Treatiſe, oppos'd the Deſign. Next Morning the Woman was found recover'd from her profound Syncope, which, conſidering the intenſe Cold of the Seaſon, had probably prov'd a real Cauſe of her Death, had ſhe been taken out of her Bed.

It is alſo ſufficiently known, that Cardinal *Spinoſa*, firſt Miniſter to the King of *Spain*, being ſuppoſed dead, and committed to a Surgeon in order to be embalm'd, thruſt away the Hand which conducted the fatal Inſtrument, which put a real End to his Life. But, notwithſtanding this Accident, the barbarous Surgeon proceeded to finiſh the Operation.

But as Submerſion, or Drowning, is the Subject of our preſent Enquiry, I ſhall only farther take Notice of the Hiſtories relating thereto.

The

The celebrated *Kunckel*, in *Ephemerid. Nat. Curioſ.* informs us, that a young Man had the Misfortune to fall from a Boat into the Water, and ſunk to the very Bottom, about fifteen hundred Paces from the Shore, which he did not reach till two Hours after. However, as it is natural for Perſons to give an Account of the ſeveral Circumſtances attending their reſpective States of Calamity and Diſtreſs, the young Man inform'd thoſe who had the Curioſity to enquire into his Condition during that Time, that, whilſt he was making the moſt ſtrenuous Efforts to preſereve his Life, he thought of nothing but God, and the Means of recommending himſelf to his Favour and Acceptance; that the Voice of his darling Siſter, who wept bitterly on the Shore, for the Fate of her Brother, had ſerv'd to conduct him to the Land; that the Diſturbance of the Water by thoſe who ſought for him, and the Lamentations of the People on the Shore, were not only diſtinctly heard by him, but alſo prov'd extremely ſhocking and uneaſy to him; that he thought his Reſpiration was carried on, without his knowing in what Manner; that the Water had not penetrated into any of the Cavities of his Body; and that he was hot, inſtead of being cold.

The ſame judicious Author informs us, that he had an Opportunity of examining a Fiſherman, who fell from a Boat into the ſame Place, and was, by Means of the Ice, kept under Water for three Days, but upon his being found, appear'd full of Vigour, ſaid that he enjoy'd good Health, and affirm'd, that the moſt remarkable Circumſtance of which he had been conſcious was, that a large Bladder had been form'd around his Head for his Preſervation.

The memorable Accident which befel the *Swiss Diver* is so well attested, and accompanied with such a peculiar Train of Circumstances, that it cannot fail to make the most lively Impressions upon every Person capable of the smallest Degree of Reflection. As Necessity lays a Foundation for Industry, which frequently cannot be employ'd, but in a Manner, which is either prejudicial to Health, or fatal to Life, so this adventurous Man follow'd the Business of plunging into the Water, and searching those Holes in which he imagined the larger and better Sort of Fishes were lodg'd. Accordingly, being employ'd as Dr. *Brubier* relates the Story, to furnish a Dish of Fish for a Company, who intended to regale themselves with a fine Dinner, he cheerfully undertook the Task. His Employers, in the mean Time, accompanied him to the Brink of the River, and, seeing him plunge into the Water, retir'd, not in the least doubting but he would keep his Word. The *Swiss*, however, happening not to bring the Fish at the Hour appointed, the Company, when the Afternoon was pretty far advanc'd, went to the Banks of the River, in order to know the Reason of their Disappointment. As the Clothes of the Diver lay on the River-side, so they soon suspected his deplorable Fate, and accordingly order'd him to be search'd for with Hooks, in the Place into which they had seen him plunge. The Efforts for this Purpose were not in vain, for he was at last found, and taken out of the Water, tho' wounded in several Parts.

As this unfortunate Man had been under Water for nine Hours, so the Curate of the Place, whose Profession call'd for some Care of a Person in such a Situation, had a Mind that he should be forthwith interr'd; and he had been infallibly committed

ted to the Grave, had not the celebrated Mr. [illegible] a Member of the Royal Academy of *Inscriptions*, who obſerv'd a Kind of Ebullition in the Water diſcharg'd from his Mouth, poſitively affirm'd that he was not dead. For that Gentleman juſtly aſcrib'd this Ebullition to the languid and imperceptible Remains of Reſpiration.

This Conduct of Mr. *Egly*, however uncommon, yet made ſo deep an Impreſſion upon the Spectators, that they carried the unfortunate Diver into an adjacent Houſe, where having laid him out at full Length, they compreſs'd his Abdomen, in order to procure a Diſcharge of the Water he had ſwallow'd. By this Means having in three Quarters of an Hour evacuated a conſiderable Quantity of Water, he mov'd one of his Legs, a Circumſtance which ſufficiently evinc'd that he ſtill retain'd ſome faint Remains of Life. For this Reaſon he was, by Mr. *Egly*'s Orders, wrap'd up in warm Sheets, and gradually reſtored to a natural Heat. Then being laid in a warm Bed, and his Life becoming gradually more conſpicuous, a liberal Veneſection was made, which was ſucceeded by a Sigh, then by a ſlight Knowledge of what had befallen him, and ſoon after by a total Reſtitution of Health; and tho' Gratitude is rarely to be met with in the Breaſts of the Vulgar, yet this important Service ever after touch'd the Heart of the *Swiſs*, with the higheſt and moſt lively Senſe of the Obligations he lay under to Mr. *Egly*.

Mr. *Durham*, a Gentleman ſufficiently celebrated for his untainted Integrity, and extenſive Learning, in his *Phyſico-Theology*, quotes the following Hiſtory from *Pechlinus*, an Author of no leſs Candour and Reputation:

About eighteen Years ago, a Gardener of *Froningholm*, now ſixty-five Years old, and ſufficiently vigorous and robuſt for a Perſon of that Age, made a generous Attempt to reſcue an unfortunate Neighbour who had fallen into the Water; but, being too fool-hardy, he ventur'd upon the Ice, which broke, and let him fall into the River, which at that Part was eighteen Ells in Depth: He went perpendiculary to the Bottom, in which his Feet ſtuck for ſixteen Hours before he was found. He himſelf ſays, that he was no ſooner under Water, than he became rigid, and loſt not only the Power of Motion, but alſo all his Senſes, except that of Hearing, which was affected by the Ringing of ſome Bells at *Stockholm*. He at firſt alſo perceived a Kind of Bladder before his Mouth, which hinder'd the Ingreſs of the Water by that Paſſage, tho' it enter'd freely into his Ears, and produc'd a Dulneſs of Hearing for ſome Time after. This unfortunate Man was in vain ſought for during ſixteen Hours, at the End of which Time he was taken up by Means of an Hook fix'd in his Head, and upon his total Recovery ſaid, that he was ſenſible of that particular Part of his Fate. However, whether from the prevailing Cuſtom of the Country, or the Perſuaſion of particular Perſons, certain Attempts were made in order to reſtore him to Life: For this Purpoſe he was wrap'd up in Blankets, leſt the Air entering too precipitately into his Lungs ſhould prove fatal to him. In this Condition, being gradually warm'd by Means of Sheets, he was rubb'd and ſtimulated till the Motion of his Blood, which had been check'd for ſo many Hours, return'd. At laſt he was totally reſtor'd by Means of Cordials, and antiapoplectic Liquors. He as yet bears the Mark of the Hook, and ſays, that he is ſtill ſubject to violent

lent Head-achs. This ſingular Accident, atteſted by the Oaths of Perſons who had been Eye-witneſſes to it, induc'd the Queen to give him an annual Penſion, and he was introduc'd to the Prince, in order to give an Account of what had befallen him.

The celebrated *Pechlinus* has wrote the Hiſtory of a Woman, who, remaining under Water for three whole Days, was happily reſtor'd to Life, almoſt in the ſame manner as the Gardener. This Fact was ſo notorious, that the learned *Tilaſius*, Library-keeper to the King of *Sweden*, and in whoſe Time the Woman was ſtill alive, gave the following Certificate of it, which is ſtill kept in the Archives of the *Acad. Natur. Curioſ.*

There lately was in Dalia, *commonly called* Wormſland, *a Woman of the Name of* Margaret Larſdotter, *who having the Misfortune to be thrice drown'd, remain'd the firſt Time, ſhe being then young, for three whole Days under Water, but the two other Times had more ſpeedy Relief afforded her. She died in* 1672, *in the ſeventy-fifth Year of her Age.* Tilaſius.

Tho' this Accident, and the Delivery from it, happening ſo many different Times to the ſame Perſon, may by ſome be look'd upon as fabulous and romantic, yet upon the whole it appears to be cloath'd with the moſt genuine Character of Truth and Evidence; for is it credible, that a Man of Probity, Candour, and Learning, as we may readily ſuppoſe the Librarian of a rich and powerful Monarch to be, ſhould in a manner ſo poſitive and circumſtantial dare to affirm a Fact, which was only ſuſpected, and much leſs one that was abſolutely falſe? Is it probable that a Man of *Pechlinus*'s Character, who is no leſs univerſally than juſtly

applauded for his extenſive Erudition and conſummate medicinal Knowledge, ſhould compoſe an elaborate Treatiſe in order to explain the Poſſibility of this Fact, without taking due Pains to have its Reality ſufficiently confirm'd and aſcertain'd? or, in a word, is it to be ſuppoſed, that this Phyſician, who was look'd upon as the Glory and Ornament of the *Swediſh* Nation, ſhould have the Impudence to appeal to all the *Literati* of *Sweden*, for the Truth of a Fact, which had not the Sanction of ſufficient Evidence? Why ſhould we be more ſcrupulous than *Pechlinus*'s contemporary Authors, who never call'd the Truth of this Fact in Queſtion? The celebrated *Bartholin*, in *Act. Med. Haffn. Tom.* 3. *Obſ.* 42, ſpeaks of it in the following manner: "I can by no Means "remain diffident with reſpect to the Truth of a "Story confirm'd by the concurring Teſtimonies "of ſo many Witneſſes of Candour and Veracity; and of which *Pechlinus* has demonſtrated "the Poſſibility by other Examples of a ſimilar "Nature; I am only ſurpris'd, that ſo ſingular a "Narrative ſhould be ſo long buried in Oblivion, "in a Nation otherwiſe ſo curious and fond of "Diſcoveries."

But we ſhall have no manner of Reaſon to doubt of this Fact recorded by *Pechlinus*, when we reflect, that other celebrated Phyſicians and Philoſophers aſſure us of the Truth of other Accidents highly ſimilar and analogous to it. Thus *Alexander Benedictus*, Lib. x. Cap. 9, ſpeaks in the following manner: "Life has been frequently ſeen "reſtor'd to Perſons who have remain'd under "Water during forty-eight Hours." The ſame Author, for this very Reaſon, thinks it highly improper, to inter drown'd and hyſteric Patients, till ſeventy-two Hours after their ſuppos'd Death.

Borelli,

Borelli, in *Cent.* 2 *Obſ.* 2, informs us, that a cer-
" tain Perſon of Diſtinction, having remained for
" a long Time under the Water, was taken for
" dead when he was found; but, proper Efforts
" being made to reſtore his Life, he was rouſed
" from his ſuppoſed Death, and long ſurvived his
" Misfortune." Beſides, the Credibility of the Fact, told by *Pechlinus*, is ſufficiently confirmed by the Suffrage of the learned and judicious *Zacchias*, who, in his 79th Conſultation, wrote in order to determine, whether the Return of Life to a young Man, who had remained an Hour under Water, was miraculous, and, as ſome ſuperſtitious People would have it, to be aſcribed to a Perſon of ſuperior Sanctity, ſpeaks in the following manner: " This Event is ſo far from being
" miraculous, that it can hardly come under the
" Denomination of ſurpriſing, ſince vaſt Numbers
" of Perſons have returned to Life, after having
" been drown'd, or ſuffocated in any other man-
" ner, not only for ſome Hours, but alſo during
" one, and even three whole Days; becauſe the
" Suppreſſion of Reſpiration in the Water had
" occaſioned an Oppreſſion of the Spirits, and
" had brought on an apoplectic Paroxyſm, which
" rendered them apparently dead, tho' their Lives
" were really preſerved by Tranſpiration, which,
" augmenting gradually, laid a Foundation for
" a free Reſpiration."

The Poſſibility of retaining a Principle of Life for a long Time under Water, is ſtill more ſurpriſingly confirmed by *Kunckel*, in *Miſcellan. Nat. Curioſ. Decad.* 3. *An.* 5 & 6. *Obſ.* 71. where he ſpeaks in the following manner: " I am ſuffici-
" ently ſenſible, that in *Sweden*, no one doubts of
" the Poſſibility of retaining Life under Water for
" eight Days; and that the following Accident is

" by

" by no Means called in Queſtion by thoſe who
" live near the Place where it happened. Some
" Time ago, about four Leagues from the Town
" of *Falung*, a Painter fell from a Boat into the
" Water in ſuch a manner, as to remain upright
" with his Feet at the Bottom. He was in vain
" ſearched for during eight Days; at the End of
" which Time, he appeared alive on the Surface
" of the Water. The Magiſtrate and Clergyman
" of the Place aſked him the following Queſtions,
" Whether he had reſpired all the Time of his
" Submerſion? To which he anſwered, He knew
" nothing of the Matter. Whether he had thought
" upon God and recommended his Soul to him?
" To which he replied, Very often. Whether he
" could ſee and hear? To which he anſwered,
" Yes, and ſaid that he would often have laid
" hold of the Hooks employ'd in finding him, if
" he could have moved his Arms. He alſo add-
" ed, that the Fiſh proved highly offenſive and
" uneaſy to him, by the Attacks they made on his
" Eyes; and being aſked by what Means he guard-
" ed againſt theſe Attacks, he anſwered, by mov-
" ing his Eye-lids. As to his Senſe of Hearing,
" he affirmed, that nothing was more ungrateful,
" and even painful, to him than ſtriking the Sur-
" face of the Water; and that, in a particular man-
" ner, he was affected with a violent Pain of his
" Ears, which was forthwith communicated to his
" whole Body, every Time People came to draw
" Water in Buckets. When he was aſked, Whe-
" ther he had been ſenſible of Hunger, and diſcharg-
" ed his Excrements? He reply'd, that he had not.
" Being interrogated, Whether he had ſlept? He
" anſwered, he knew nothing of it, but believed
" he had, becauſe he was ſome Times deprived of
" all Senſation and Reflection; adding, that all

" the

" the Thoughts he remembered to have paſſed in " his Breaſt, had only God, and the Means of " his own Deliverance, for their Objects."

The Nature and Circumſtances of the Accident, now related, lay a ſufficient Foundation, for our believing the following memorable Event, eſpecially as it happened to a Perſon of Diſtinction; and is atteſted as authentic by Men of Learning and Probity:

Gocellinus, a young Man, and Nephew to one of the Archbiſhops of *Cologne*, had the Misfortune to fall into the *Rhine*, and was not found for fifteen Days after; and being laid in an adjacent Church, in order to be interred, ſoon returned to Life, and ſurvived the Accident a long Time.

As there are a great many ſecret Things in Nature, and probably numberleſs latent Circumſtances in the animal Oeconomy, with which we are entirely unacquainted; and as Perſons of a curious and attentive Turn of Mind daily obſerve Accidents which they before thought impoſſible, ſo we have no Reaſon to doubt of ſurpriſing Facts, related by Men of Learning and Candour, nor formally to deny the Truth of Events, which at firſt appear incredible. Of this Kind is the following Narrative:

The celebrated Mr. *Burmann* aſſures us, that, in *Baneſs* of *Pithovia*, he heard a funeral Sermon preached upon the Death of one *Laurence Jones*, a Man of ſeventy Years of Age, who, as the Preacher ſaid, was drowned when ſixteen Years old; and continued ſeven Weeks under Water, notwithſtanding which, he returned to Life, and enjoy'd good Health. However viſionary and romantic this Accident may appear, in the Eyes of thoſe who pretend to have diveſted their Minds of vulgar Errors, yet it has met with Credit from the moſt penetrating

netrating and ſagacious Authors who lived at the Time in which it happened. Thus the learned and judicious *Langelott*, in *Miſcellan. Natur. Curioſ. Decad.* 1. *An.* 6. *Obſ.* 20, not being able to conceive how a Perſon can preſerve a Principle of Life ſo long, without the Aſſiſtance of the Air, in Waters ſo cold and full of Nitre, as thoſe of *Sweden*, and not being ſatisfied with ſimilar Accidents daily happening to ſome Birds and Inſects, is yet ſo far from doubting of the Truth of this Accident, that he applies to the learned Members of the *Acad. Natur. Curioſ.* for their Opinion and Explication of it; by which Means he imagined that effectual Meaſures for reſtoring many drown'd Perſons might be diſcovered. Beſides, it is by no Means probable that a Man of Mr. *Burmann*'s Veracity would forge ſuch a Story, in order to ſee what enormous Lengths Credulity was capable of carrying his Fellow-Creatures; nor is it poſſible that the Clergyman ſhould, from the Pulpit, aſſert this Fact as true, if it had not really been ſo, ſince *Laurence Jones* was a Native of the Place, and well known to every one of his Audience.

But upon the Whole, granting that this Narrative of *Laurence Jones* was falſe, which however we have no Reaſon to believe, yet the Recital of it has a great Tendency not only to illuſtrate our Subject, but alſo to produce happy Effects in Life; for, 1ſt, It is certainly the genuine and uncontroverted Intereſt of the Public, to be apprized of the Poſſibility of a Perſon's retaining a Principle of Life for a long Time under Water; 2dly, The Concluſion to be drawn from this ſeemingly miraculous Effect is, that if, after a long Time, a Body is taken out of the Water, without the Signs of Putrefaction, it is the Duty of thoſe who find ſuch a Body, to treat it as if there were ſtill a

Poſſibility

Poſſibility of reſtoring it to Life; and 3dly, If it is certain from uncontroverted Facts, that Perſons have retain'd Life under Water for ſeveral Days, there is no Reaſon, from the Laws of the animal Oeconomy, and the hitherto known Properties of the animal Fluids, to diſbelieve that the like ſhould happen to Perſons who have alſo remain'd under Water for ſeveral Weeks.

As our Modeſty ought always to be proportion'd to the difficult and intricate Natures of the Subjects we pretend to conſider, ſo we frankly acknowledge, that theſe and other ſimilar Accidents, as it were, bewilder the Mind, and perplex the moſt penetrating Capacities, when they attempt to account for them; ſince we have never yet diſcover'd wherein the conſtituent Principle of Life exactly conſiſts, and ſince there are various Properties both of the Solids and Fluids of the human Body, to which we are intire Strangers. Some, however, affirm, that a Principle of Life may, in the deplorable State of Submerſion, be retain'd for a long Time, becauſe the Coldneſs of the Water renders the Circulation ſlower, and ſuppreſſes the Tranſpiration of the vital Air contain'd in the Blood; whilſt, at the ſame Time, ſome Portions of the Air, lodg'd in the Water, probably penetrate into the Bodies of ſuch Perſons. But *Plazerus* and *Barthol* ſeem to account in a more rational and ſatisfactory manner for Phænomena of this Kind. The former of theſe Authors, in explaining how a Woman, who was drown'd in the *Rhine*, for murdering her own Child, return'd to Life after ſhe was found, affirms, that this Accident was the Effect of a Syncope, in which Reſpiration and the Motion of

the Heart are ſtopt. Now 'tis certain from Experience and Obſervation, that theſe two Functions may be ſuppreſs'd without the actual Loſs of Life, as is frequently obvious in violent Syncopes, and hyſteric Paroxyſms, from which the Patients do not often recover in an Hour or more, during which Time, the ſlighteſt Indications of Life by the Pulſe and Reſpiration are not to be obſerv'd.

If any one ſhould ſay, that it beſpeaks an unpardonable Exceſs of Credulity, to believe that a Syncope may laſt for a Week or longer, and that that conſequently the Motion of the Heart and Pulſe may be for that Time ſuſpended, without neceſſarily producing Death; we may juſtly reply, that hitherto no Perſon has diſcover'd wherein the Eſſence and Principle of Life conſiſts; and that there are in Nature various Phænomena, which ſeem to prove, that the Motion of the Heart, and the Circulation of the Humours, are rather palpable Signs of the Exiſtence of Life, than its proximate and immediate Cauſes. This Doctrine we ſhall endeavour to eſtabliſh, in a ſtrictly analogical manner, by comparing thoſe Events which happen to Vegetables and the Brute Creation, with ſimilar Accidents which befall Mankind.

For this Purpoſe we ſhall firſt conſider the State and Condition of ſuch Plants, as retain a Principle of Life and Vegetation during the whole Winter. All the Difference, according to *Pechlinus*, between theſe, and the Plants of the animal Kind, is, that in the latter the Principle of Motion is weaker, and the Texture of the Fibres leſs firm; whereas the former contain a much larger Quantity of Oil, and have the Spirit ſubſervient to their Vegetation repell'd by the Cold, to the Bulbs,

Roots,

Roots, and Seeds, where it circulates in a languid manner, without having Force to propel Buds, Flowers, and Bloſſoms, till the kind and genial Heats of the Spring render it more powerful and active. Why may we not, therefore, ſuppoſe that ſomething analogous to this may happen in ſome human Bodies, who have been under the Water for ſome Time?

This is not the only Inſtance in Nature, which we can bring in Confirmation of our Doctrine; for certain Inſects paſs the whole Winter in *Chryſalides*, or conſiderably hard Pellicules, without diſcovering the ſmalleſt Signs of Life, tho' 'tis certain they are not dead, ſince a ſmall Degree of Heat only, is requiſite to produce their laſt Metamorphoſis. The Reaſon of this apparent Death is the Cold of the Atmoſphere, ſo inſpiſſating their Fluids, as that they can only circulate in a faint and languid manner, round an highly minute and ſmall Center. The Degree of Fluidity which they retain is, however, ſo conſiderable, that a more intenſe Cold than we perceive on the Earth, is incapable of totally coagulating them, as is ſufficiently evinc'd by the curious Experiments of Mr. *Reaumur*.

This Phænomenon is not only obſerv'd in the *Chryſalides* of Inſects, but the *Seminal Principle* is alſo preſerv'd free from Coagulation, and without diſcovering the ſmalleſt Sign of Life, in Eggs, which may be conſider'd as the *Chryſalides*, or Pellicules of Animals, whoſe Life is perceptible. Aquatic Inſects, alſo, plunge themſelves into the Mud, where they remain without Motion, till the Spring; which holds equally true of Frogs and Toads, according to *Valentinus*, in *Diſſert. Epiſtol.* 4.

The like happens to some terrestrial Insects; for Mr. *Reaumur* has by Experiment and Observation sufficiently evinc'd, that Ants, during the whole Winter, remain apparently dead, till the Approach of the Spring.

A third and more powerful collateral Proof of this Doctrine is drawn from the Consideration of some Animals, whose Blood is warm, and circulates in the same manner with that of the Human Species; since in these also the Circulation and Respiration are suppress'd during the Winter, but return in the Spring.

Thus of Swallows it may be said, that during one Half of the Year they are dead, and the other alive. *Olaus Magnus* and *Scheffer*, in a Letter wrote to *Hevelius*, affirm, that, in some northerly Countries, it is very common for Fishermen to find in the Water large Clusters of Swallows, which, in the Beginning of the Autumn, had thus pil'd themselves up. Those Authors also inform us, that some Species of Swallows spontaneously seek a Refuge in the Waters, others take their Flight to foreign Climates, others conceal themselves in the Holes of old and decay'd Buildings, in the Sand, and in their own Nests; and that others, finding a Decay of Strength in their Passage to other Countries, plunge themselves into the Sea, where they remain till the genial Spring rouses their latent Principle of Life and Motion.

The celebrated *Kircher*, in *Mund. subterran.* Lib. 8. Sect. 4, informs us, that the Inhabitants of *Peloponnesus*, and other Territories of the *Archipelago*, have told him, that, every Year, they observ'd large Quantities of Storks and Swallows flying thro' their Countries from *Egypt* and the

Coasts

Coasts of *Lybia*, and that these latter, when fatigu'd with flying, plac'd themselves, to the number of five or six, on the Back of a Stork, whom they recompens'd by an uninterrupted and melodious Song. There, are, therefore, continues the Author, some Swallows which fly from one Country to another; but 'tis equally certain from Experience, that the Swallows of cold Climates make no such Voyages; but during the Winter conceal themselves in Caves, Lakes, Rivers, Seas, and the Cavities of Trees.

Olaus Magnus, in Lib. 15. Cap. 10, informs us, that such Swallows as are taken out of the Water before the due Time, do not live long; and adds, that the Inhabitants of *Tivoli*, when shewing him Mount *Seisso*, which Name it receives from a foolish Report of its being divided at the Crucifixion of our Saviour, assur'd him, that, in the Winter-Season, large Quantities of Swallows apparently dead were to be found on it; whereas no such Animals are to be found there in Summer. He then quotes *Cysatus*, who in his Description of *Swizerland* affirms, that, about *Christmas*, some Workmen, when digging up the Earth for laying the Foundation of a public Edifice, found a subterraneous Cave, from which flew about twenty or more Swallows. Whence the Author concludes, that all these Birds do not pass the Sea at their Disappearance, but that some retire into the Cavities of Mountains, others in Hollow-Trees; but that this most frequently happens in northerly Climates.

Fortunus Licetus, in *Tr. de Feriis Altric. Animal. Disp.* 19, affirms, that, in upper *Poland*, every Person may be experimentally convinc'd, that the same

ſame Swallows which in Summer build their Neſts upon the Tops of Houſes, towards the End of *September* plunge themſelves into Ditches and Rivers, where they remain conceal'd till about the Middle of *May*. He, alſo, informs us, that, when the Inhabitants ſeeing Fiſh thro' the Ice, break it in order to catch them, they alſo frequently find Cluſters of Swallows adhering to each other, without diſcovering the ſmalleſt Signs of Life, till they are brought to a Stove, where they ſoon return to Life. But what is ſtill more remarkable is, that as ſoon as the *Polanders*, who imagine it unlawful to kill theſe Swallows, ſet them at Liberty, they forthwith fly back to the Water, and plunge themſelves into it.

The celebrated *Huet*, Archbiſhop of *Avranches*, who travell'd thro' *Sweden*, informs us, that between *Caen* and the Sea, along the Shore of the River *Orne*, there are many Caves, in which, during the Winter, have been found large Cluſters of Swallows, ſuſpended like ſo many Bunches of Grapes; and that the like was long ago obſerv'd in *Italy*. For *Pedo Albinovanus*, in the Elegy he compos'd on the Death of *Mecænas*, ſpeaks of the Retreat of the Swallows to the Rocks, as an infallible Sign of the Approach of Winter:

" Congelantur Aquæ, ſcopulis ſe condit Hirundo,
" Verberat egelidas garrula vere Lacus."

Bodin, quoted by *Camerarius*, *Cent.* 7. *Hiſt.* 71, informs us, in the ſecond Book of his *Theatre of Nature*, that when the People, who inhabit the Coaſts of the *Baltic* Sea, are employ'd among the Rocks in ſearching for yellow Amber, they frequently

quently find large Clusters of Swallows. *Camerarius* subjoins, that some Authors affirm, that "Swallows conceal themselves in the Bottom of the "Sea, where they sleep till the Appearance of a "proper Season for their quitting it; but this is "impossible since they have Lungs, and for that "Reason must necessarily perish in such a Condition." But however specious and conclusive this Reasoning of *Camerarius* may appear, yet 'tis certain that the Truth of Facts, which have actually happened, can never be invalidated.

Franciscus de Frankenau, in his Medicinal Satyres, confirms this Opinion with Respect to Swallows, by the Authorities of *Lauremberg*, in *Acer. Philol.* Lib. 3. Cap. 71; of *Isaac Vossius*, in his *Append. de Lucis Natur.* Cap. 1; of *Deausingius*, in *Vindic. Fæt.* Spect. 5; and of *Fournier*, in his Geography, who in Part 1. Lib. 2. Cap. 5. informs us, that they are commonly found in the *Norwegian* Seas, as also in the Lakes and Rivers of *Silesia*, *Poland*, *Bohemia*, and *Moravia*; and that, in the Beginning of the Autumn, large Numbers of them plunge themselves into Wells. The same Author, also, establishes his own Opinion by the additional Suffrages of *Cromerus*, in *Hist. Polon.* Lib. 1; of *Hevelius*; of *Marcellus Donatus*, in *Hist. Med. Memorab.* Lib. 4. Cap. 12, and of *Helvicius*, in his Epigrams.

The celebrated Mr. *Falconet*, whose Judgment and Veracity render his single Word a sufficient Evidence, informs us, that, being in the House of a Gentleman of *Brest* in the Winter Season, he saw a Servant bring in a Kind of Mass or Lump, which appeared to be Earth, and which some Fishermen had caught in their Nets. By washing it carefully,

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in order to diſcover what it was, it was found to be a Group of Swallows, which reſum'd Life by being expos'd to the Fire for ſome Time.

Swallows are not the only Birds which conceal themſelves in the Bottoms of Rivers, in order to paſs the Winter; for *John Baptiſte de Fulgoſa*, formerly Doge of *Genoa*, affirms, that *Gervas Tibellerius* wrote to *Otho* the Fourth, that, ſome Perſons having thrown their Nets into a River of that Country in the Winter Time, they brought to Land a large Quantity of Storks, which were apparently dead, with their Beaks fix'd in each other's Fundament; but they were ſoon reſtor'd to Life, by means of Heat. The ſame Author adds, that in 1467, near *Metz* in *Lorrain*, a large Number of apparently dead Storks were found in a River, and that, being put into a warm Bath, they recover'd Life.

The learned *Voſſius* in *Append. de Lucis Natur.* informs us, that at the Approach of Winter, Storks, Herons, and ſome other Birds of the like Nature, do not fly to *Egypt*, or into more temperate Climates, but plunge themſelves into Ditches and Marſhes.

The Poſſibility of retaining Life for a long Time under Water is ſtill farther evinc'd, by conſidering thoſe Birds with which our Fields and Foreſts are richly ſtock'd in Summer, but which are not to be ſeen in Winter. If it ſhould be ſaid, that theſe, during the Winter, live upon the Stores they have amaſs'd in the Summer; I anſwer, that they are by no Means provident againſt future Want. Hence they muſt neceſſarily conceal themſelves, in Places ſuited to their particular Natures; and as it is equally impoſſible for them, as for the human Species, to live

awake

awake without Aliments, 'tis more than probable that, during the whole Winter, they are, as it were lock'd up in ſo lethargic a Sleep, that they ſuſtain no Loſs or Diſſipation of their Fluids, and conſequently require no Reparation.

If it ſhould be aſk'd, whether theſe Animals, during ſuch a State, retain a real Principle of Life? I anſwer, that the Thing is not only probable, but may be alſo evinc'd from Fact and Experience, ſince the moſt celebrated natural Hiſtorians and Phyſicians give us ſtrong and uncontroverted Inſtances of this Kind. Thus in *Ephemerid. Nat. Curioſ.* we are informed, that a certain Gentleman, in the Winter Seaſon, order'd an hollow Trunk of a Sallow Tree, which by his Direction had been cut down the preceding Autumn, to be laid on the Fire; but, a ſmall Portion of it happening to be left in a Corner of the Room, he had the Curioſity to examine it, and, upon his doing ſo, found Feathers arranged and diſpoſed in a natural Manner: Theſe he gently plucked off, and underneath found the Fleſh of a ſmall Bird which he believed to be dead, though he could not diſcover to what Species it belonged. However, with reſpect to this Circumſtance, he was ſoon undeceived; for, having expoſed it to the Influence of the Fire, it ſoon diſcover'd palpable Signs of Life. Something ſimilar and analogous to this, no doubt, happens with reſpect to many of thoſe Quadrupeds which inhabit our Foreſts, for Want of a Nouriſhment proper to give their Blood that Degree of Fluidity, which is abſolutely neceſſary to its Circulation, ſince it is certain, that a far ſmaller Number is to be ſeen in Winter than in Summer.

After theſe Examples of an apparent Death in Birds whoſe Blood is warm, we have no Reaſon to be ſurpriz'd at *Pechlinus*, when he affirms, that, in

the Winter Time, Fiſhes not only appear dead, but are conſequently covered over with a Cruſt of Ice in their Holes, without having the vital Principle deſtroyed in them; for they begin to live afreſh, when the Heat of the Atmoſphere, or an artificial Fire, melts the Ice. The like, continues the Author, happens to Serpents, Toads, Frogs, Tortoiſes, and in a Word all amphibious Animals, when the Cold inſpiſſates their Juices; which, being naturally viſcid, are conſequently more proper to prevent the Diſſipation of that vital Spirit, which is abſolutely neceſſary to reſtore them to Life.

'Tis to be obſerved, that thoſe Fiſhes which have been thus frozen, do not long ſurvive their artificial Reſtitution to Life; becauſe, the Froſt having altered the Principles of their Blood, the vital Spirit, when beginning to act and unfold itſelf, can no longer form a Maſs of Fluids of an uniform Nature. Thus Wine when frozen, and artificially thaw'd, contracts a diſagreeable Flavour, becauſe the Solution, being procured in an unnatural Manner, hinders the ſpirituous Part of the Wine from mixing with its other Principles, in the ſame Order and Proportion as before.

What *Pechlinus* advances, with reſpect to Fiſhes, is entirely conformable to the Opinion of *Theophraſtus*, in *Tr. de Piſcibus in ſicco degentibus*, where we are informed, that the Inhabitants of *Pontus* frequently find Fiſhes in the Ice, which diſcover no Signs either of Motion or Senſation, till they are put into a Fiſh-Back, or laid among Straw. This Circumſtance, according to *Theophraſtus*, happens particularly to the Gudgeon, and ſome other Fiſhes of a ſimilar Nature.

The laſt Proof of the Poſſibility of a Perſon's retaining a Principle of Life for a long Time under Water, without a Supply of Aliments for the Pur-

Purpoſes of Nutrition, is drawn from a Conſideration of ſome Quadrupeds, as the Hedge-Hog, the Marmotte, the Dormouſe, and ſome others, which, in the Beginning of Winter concealing themſelves in the Earth, are ſeiz'd with ſo profound a Sleep that they appear to be dead, ſince neither the Pulſation of their Arteries nor their Reſpiration are perceptible. This Circumſtance, no doubt, induc'd the celebrated *Harvey*, in *Lib. de Generat. Animal. Exercit.* 50, to ſpeak in the following Manner: "Some ſanguineous Animals "live long without any Pulſe, and lie conceal'd "during the Whole of the Winter, notwithſtanding which they remain alive, tho' their Heart "retains no Motion, and their Reſpiration ſtops, "juſt as it happens to Perſons attack'd with Sincopes, and hyſteric Fits, whoſe Pulſe is totally a-"boliſh'd." Tho' *Harvey* was the glorious Diſcoverer of the Circulation of the Blood, and may for that Reaſon be ſuppos'd to be a keen Advocate in its Behalf, yet 'tis ſufficiently obvious from this Paſſage, that he did not believe it abſolutely neceſſary to the Preſervation of Life. But *Pechlinus*, whether from Prejudice, or rational Deductions from what he had obſerv'd, is of Opinion, that, in theſe Animals, Reſpiration is carried on, by a Motion of the Diaphragm, ſo inſenſible as to eſcape the Eye of the Obſerver. He alſo obſerves, that, in this State, it is neceſſary their Reſpiration ſhould be ſuch, becauſe if it was perform'd in the uſual Manner, the Motion of the Blood would be ſo likewiſe; in conſequence of which, the Tranſpiration and Neceſſity for Aliments would be equally ſtrong; a Circumſtance incompatible with the Condition of theſe Animals, which lie hid under the Earth during the whole Winter.

Tho' theſe Relations may poſſibly appear very ſingular and ſurpriſing to Perſons unacquainted with Natural Hiſtory; yet they infallibly prove, that, in the brute Creation at leaſt, Reſpiration, the Circulation of the Blood, and Pulſation of the Arteries may ceaſe for a long Time, without the total Extinction and Deſtruction of Life. Now is it not highly probable, or rather abſolutely certain, that ſomething ſimilar and analogous to this may happen to human Creatures, who have the Misfortune to be drown'd, ſince in both the Solids and Fluids act and move by the ſame Laws, and ſo in both Suffocation muſt be the ſame Thing, and conſequently its Effects remov'd by the ſame Means?

Beſides, there is by no Means any Reaſon for believing, that an Inſtance of this ſurpriſing Abſtinence and Want of Food, produc'd by ſuch a profound and lethargic Sleep, as that of the Marmotte, is not to be found among the human Species; for in *Miſcellan. Academ. Natur. Curioſ. An.* 8. *Obſ.* 97. the celebrated *Ludovicus*, firſt Phyſician to the Duke of *Saxe-Gotha*, informs us, that a young Girl, who, for ſome Fault ſhe had committed being apprehenſive of a ſevere Chaſtiſement from her Parents, retir'd to the moſt conceal'd Part of a Thicket, where, ſeven Days after her Elopement, ſhe was found lying on her Belly with all the apparent Signs of Death, except that her Limbs were ſtill flexible and pliant; her Viſage was overſpread with a viſcid Phlegm, which was cover'd with an hoary Kind of Down, and with the falling Leaves which had adher'd to it. Her Mouth and Noſtrils were entirely full of a thick Mucus: But, notwithſtanding theſe ſeemingly diſcouraging Circumſtances, the Phyſician, call'd to her Aſſiſtance, order'd her Body to be warm'd by Means of Friction: Then, with warm Water,

waſhing

waſhing away the Phlegm which cover'd her Face, and the viſcid Mucus which obſtructed her Mouth and Noſtrils, he pour'd into her Mouth a Spoonful of Brandy, which ſeem'd to go down her Throat, and was the only Cordial he had at hand. Upon exhibiting a ſecond Spoonful, ſhe fetch'd a Sigh, and a third made her open her Eyes.

We now proceed to conſider the moſt proper and efficacious Meaſure to be taken for the Relief of drown'd Perſons; for which Purpoſe we ſhall previouſly inveſtigate and aſcertain the genuine Cauſe of Suffocation.

Not only the antient Schools of *Greece* and *Arabia*, but alſo moſt of the ſucceeding Phyſicians, till the Days of *Platerus*, imagin'd that the Suffocation was produc'd by the Water which enter'd into the Stomach, Breaſt, and Lungs; in Conſequence of which falſe Notion they thought themſelves fully authoriz'd to attempt its Diſcharge with all poſſible Expedition. For this Purpoſe they order'd drown'd Perſons to be ſuſpended by the Feet, or laid upon their Bellies, on a Hogſhead or Tub, which was to be agitated from one Side to the other, imagining that by this Poſition, the Abdomen and Breaſt being compreſs'd, and the Head hanging down, the Agitation of the Veſſel muſt neceſſarily facilitate the Evacuation of the Water, which they ſuppos'd was alſo favour'd by the declining Situation of the ſuperior Part of the Body. With the ſame Intention, they alſo order'd ſuch Meaſures as had a Tendency to excite Vomiting.

But as a falſe Theory never fails to lay a Foundation for a dangerous Practice, ſo we have juſt Reaſon to condemn this Method of Suſpenſion, or Hanging by the Heels; for the Water ſwallow'd by drowning Perſons deſcends into the Stomach,

and

and not into the Thorax, ſo that it cannot prevent their Recovery. This Circumſtance muſt happen, not only ſo long as a Perſon retains a Senſe of his State and Condition, but alſo afterwards; for as the Water is hinder'd from entering into the Arteria Trachæa and Lungs by a mechanical Effort, in which Reaſon has no Share, ſo the Lungs may in this State be compar'd to an empty Bottle plung'd in Water, into which the Fluid does not enter, becauſe the Air it contains reſiſts its Acceſs; and this the rather happens, becauſe the Motion of the Breaſt, deſtin'd to attract the Air, at that Time, totally ceaſes, and conſequently nothing forces the Water to enter and fill up its Place. This Doctrine is not only evinc'd from the Structure of the Parts, but alſo confirm'd by Experience.

Thus the learned *Platerus* in *Queſt.* 5. poſitively affirms, that, if drown'd Perſons ſwallow any Water, the Quantity of it is too ſmall to prove mortal to them; becauſe he always found but very little of it in their Stomachs. He alſo adds, that moſt of the Water, which appears to be diſcharg'd from the Mouth of Perſons ſuſpended by the Heels, really flow'd from their Cloaths.

Nymman, in *Tr. de Vita Fœt. in Utero*, ſpeaks thus, " Who could believe that a Fœtus ſo long " included in the Uterus, where it moves all its " Limbs, ſhould yet never move its Jaw-bone, " nor open its Mouth? Beſides it always has its " Noſtrils open, notwithſtanding which it has ne- " ver been obſerv'd that the Liquor of the Am- " nios has enter'd its Body. Thus it is with the " Human Fœtus, as with thoſe who are drown'd, " ſince, in diſſecting many of theſe laſt, I have " hardly found a Pint of Water in their Bodies."

In the *Miſcellan. Nat. Curioſ. An.* 2. *Obſ.* 251. *Wepfer* gives an Account of the Anatomy of

ſome

ſome Beavers, one of which was drown'd. The Author having open'd the *Arteria Trachæa*, no Water was diſcharg'd from the Lungs; but there were about four Ounces of Water, like the Waſhings of Fleſh, found in the right Cavity of the Breaſt, and about three Ounces of the ſame Kind in the Left. This Extravaſation the Author juſtly ſuppoſes produc'd by the Expreſſion of a bloody Lymph from the Pores of the Bronchia of this Animal, which had for a long Time ſtruggled againſt ſo violent a Death as that of Drowning. Neither pure Water nor Water ting'd with Blood were obſerv'd either in the *Arteria Trachæa*, or in the *Bronchia*.

Bhonius, in the Appendix to his Treatiſe *de Renuntiat. Vuln. Diſſ.* 2, informs us, that, in diſſecting a great many Women drown'd for murdering their Children, he had ſhewn the Spectators, that there was little or no Water in their Lungs and Abdomen; and adds, that, in order to render himſelf more certain with Reſpect to this Circumſtance, he had drown'd ſeveral Animals, in whoſe Cavities, tho' drown'd alive, he had never perceiv'd any Water.

Dethardingius, at preſent Profeſſor of Medicine in *Copenhagen*, in a Letter wrote when he was Profeſſor at *Roſtock*, in 1714, gives us an Account of the Diſſection of a Soldier, who, attempting to make his Eſcape from a Garriſon, was drown'd in a Ditch, and upon being open'd had in his Stomach only about a Pint of Beer, which he had drank ſome Time before. The Profeſſor took care previouſly to appriſe the Spectators, that there would not be a ſingle Drop of Water in his Breaſt, which, as well as his Abdomen, was very much elevated; and the Event verified the Prediction.

Johannes

Johannes Conradus Becker, in his Treatiſe *de Submerſ. Mort. ſin. Pot. Aq.* gives us the four following Hiſtories: A Dog, ſays he, being drown'd and lying in the Water for an Hour, his Abdomen, Stomach, and Inteſtines, appear'd tumefied and inflated, tho' a ſingle Drop of Water was not found in them. The Lungs were, alſo, inflated, without containing Water, like thoſe of hang'd Perſons, but immediately collaps'd upon ſuffering the Air to eſcape thro' an Inciſion made in the *Arteria Trachæa*. The Author ſubjoins, that this Obſervation render'd the Doctrine of the Antients highly ſuſpected by him.

The ſecond, is the Hiſtory of a Peaſant, taken from the Water, after he had been ſome Weeks in it, and was entirely putrified. After opening his Duodenum, two Ligatures were made on that Inteſtine, which was very much inflated, and from the Aperture of which nothing was diſcharg'd, but a Liquor which was Chyle mix'd with Beer, of which the Peaſant had, at a Market, drank ſo liberally, as to intoxicate himſelf. The Tumefaction of the Stomach laid a Foundation for ſuſpecting that it contain'd a large Quantity of Water, tho', upon laying it open, nothing was found but a Pint of a Liquor, whoſe Smell exactly reſembled that of Beer. The Lungs were ſo much inflated, that when an Inciſion was made in the Breaſt, they burſt out; but their Inflation was ſpeedily diſſipated, by making an Aperture in the *Arteria Trachæa*, thro' which the Air was diſcharg'd with a conſiderable Noiſe. In cutting the Lungs into Pieces, no extraordinary Signs of Humidity were perceiv'd, nor were any preternatural Circumſtances obſerv'd, except Spots of different Colours.

The third Hiſtory, is that of a Woman drown'd in a Well, in whoſe Inteſtines nothing but Chyle

was diſcover'd, neither was there any Water in the Lungs. The Inteſtines collaps'd upon making a ſmall Puncture in them, and, an Aperture being made in the Arteria Trachea, the Air eſcaped thro' it from the Lungs with ſome Noiſe.

The fourth and laſt Hiſtory, related by *Becker*, is that of a Man who was found ſtanding upright in a Baſon, where he had remain'd under Water for five Days. His Stomach, which was large, was only inflated with Wind, and hardly contain'd ſix Ounces of a whitiſh Liquor. The Lungs, being equally inflated, collaps'd upon cutting the Arteria Trachea, from which the Air was diſcharg'd with a conſiderable Noiſe. When he was found, two Spoonfuls of Water were not diſcharg'd from his Mouth. "He was, however, continues *Becker*, "every where ſurrounded with Water, but "that Element, notwithſtanding the Minuteneſs "of its Parts, could not penetrate into the Arte- "ria Trachea and Oeſophagus, in order to fill the "Cavities of the Viſcera; an evident Proof that "theſe Parts were ſo defended againſt every Thing "that made an Attempt to enter them, that the "Water itſelf could not force a Paſſage into "them."

From theſe Obſervations, the celebrated Author concludes, that the Abſence of Water in the Lungs and Inteſtines is not a Proof, that a Perſon has been thrown into the Water after his Death. This Obſervation is of the laſt Importance to thoſe whoſe Buſineſs it is to make Reports before Courts of Judicature, tho' it is contrary to that of *Rodericus à Caſtro*, adopted by many Philologiſts and Criminaliſts, and among others by *Feltman* in *Tr. de Cadavere inſpiciendo*, Cap. 21. But as, in the Opinion of *Becker*, the Lungs are not inflated in thoſe who are thrown into the Water after Death, ſo we may

from their Inflation draw a Proof, that the Perſon was alive when drown'd, or put into the Water.

Since, therefore, it is ſufficiently obvious, both from the Structure of the Parts, and the Authorities of the moſt penetrating Anatomiſts, that little or no Water enters the Bodies of drown'd Perſons, ſo 'tis equally obvious, that the Practice of hanging by the Heels is not only uſeleſs, but muſt alſo contribute to deſtroy thoſe Remains of Life which may poſſibly be ~~left~~; for, by ſuch a Suſpenſion, the whole Column of the Blood, convey'd to the Heart by the inferior *Vena Cava*, will neceſſarily preſs upon that convey'd by the ſuperior *Vena Cava*, where the Blood, being interrupted in its Courſe, muſt neceſſarily regurgitate into the jugular Veins, and conſequently into the Head, where, by its Quantity and Weight, it retards the Motion of the Spirits, whoſe free Progreſs is abſolutely neceſſary to reſtore the Circulation of the Blood, on which Life in a great Meaſure depends.

As it is of great Importance to know the Cauſe of the Inflation of drown'd Perſons, ſince it is not produc'd by the Water they ſwallow, ſo the learned *Dethardingius* accounts for it in the following manner: "Thoſe, ſays he, who die in the Water, "are not deſtroy'd for Want of Air, but by "means of too large a Quantity of it; they do "not die in Expiration, but in Inſpiration; and, "in a Word, nothing more reſembles each In-"ſpiration, than the Phænomena obſerv'd in "drown'd Perſons; for, if we attentively conſider "what happens to ourſelves, we perceive that the "Breaſt is as it were lengthen'd, the Abdomen "elevated, and the Flanks inflated, and that this "State ſubſiſts, ſo long as we draw in the Air, or "retain it in the Breaſt. Now the ſame Things "happen in drown'd Perſons, only with this Dif-

"ference,

" ference, that, in the latter, the Inſpiration is
" perform'd with Rapidity and Violence, whereas
" in the former it is carried on quietly and without
" any Effort. In Perſons not drown'd, a Depreſ-
" ſion ſucceeds the Elevation; but in drown'd
" Perſons the Elevation of the Abdomen and the
" Elongation of the Breaſt ſubſiſt; by which means,
" all the Parts continue in a State of Expanſion.
" This is, no doubt, the Meaning of thoſe, who
" look upon the Death of drown'd Perſons as a
" Suffocation, and pretend that the Cauſe of it,
" and that of ſtrangled Perſons, is the ſame; for
" thoſe two Kinds of Death have a great Reſem-
" blance and Analogy, as is ſufficiently obvious
" from the Elevation of the Abdomen, which in
" hang'd Perſons ſubſiſts after their Death."

From this Theory 'tis ſufficiently eaſy to conceive, that the Inflation of the Lungs is the Cauſe of the Death of drown'd Perſons; accordingly *Dethardingius* from the preceding Doctrine draws the following Concluſions: " The Veſicules of
" the Lungs are inflated by the Air, the Bronchia
" are lengthen'd, the Blood Veſſels, diſtributed
" thro' the whole Body of the Lungs, are com-
" preſs'd; and tho' the Elongation of the Bron-
" chia aſſiſts the Entry of the Blood into the large
" Veſſels, as well thoſe proper to the Lungs, as
" the bronchial Artery and Vein, as thoſe which
" are only ſubſervient to the Circulation, as the
" pulmonary Artery and Vein, yet the Circulation
" is not carried on equally in the Capillaries; ſince
" the Preſence of a rarified Air in the Veſicules
" compreſſes the Blood, and, forcing it to ſtop
" there, hinders it from paſſing into the Left Ven-
" tricle of the Heart, in order to accompliſh the
" Circulation. Now, as ſoon as there is a conſi-
" derable Retardation in this important Function,

" the vital Motions alſo gradually ceaſe, and " Death approaches inſenſibly."

After having thus diſcover'd the Reaſon of the Inflation of the Lungs, and of the Death which ſucceeds that Circumſtance, we ſhall, with the ſame Author, inveſtigate the Cauſe which hinders the Diſcharge of the Air from the Lungs and Breaſt. This is by no means a Topic of pure Curioſity, ſince the Aſſiſtance, to be afforded to drown'd Perſons, can be of no Service, except in ſo far as it is proper to remove thoſe Obſtacles, which oppoſe and hinder the reſpective Actions of the vital Functions. Now *Dethardingius* and *Becker* pretend, that the *Epiglottis* (which is a ſmall Valve plac'd at the external Entrance of the Larynx, in order, by its covering the Glottis, to hinder all ſolid or liquid Bodies which may be put into the Mouth, from deſcending into the Canal of Reſpiration) being exactly and ſtrongly applied over the Glottis, proves the Obſtacle to the Diſcharge of the Air from the Lungs. Theſe Authors, alſo, affirm that ſuch a ſtrong and convulſive Application of the Epiglottis over the Glottis, ariſes from a preternatural Extenſion of the Fibres of thoſe Membranes of the Larynx, which cover the Epiglottis. This preternatural Extenſion they attribute to the violent Inſpiration excited by Fear, in Perſons who run a Riſk of being drown'd. Thus the incomparable *Dethardingius* reaſons in the following Manner: " If in all Kinds of Dread and Terror " we obſerve, that Reſpiration is diſorder'd; that " is to ſay, that Inſpiration is more quick, and laſts " longer; and that, on the contrary, Expiration " is intercepted, uncertain, and ſhort; it follows " of Courſe, that Inſpiration muſt be much more " ſtrong, and the Air attracted in a far larger " Quantity, when a Perſon perceives that he is

" threat-

" threaten'd with Death by the Water, which muſt " in a Moment fill the Space which ought to be " occupied by the Air."

It is pretty ſurpriſing that *Becker* and *Dethardingius* ſhould only reaſon conjecturally in this Affair; ſince the Diſſections, they made of drown'd Perſons, might have enabled them by their Eyes to judge of the Diſpoſition of the *Epiglottis* in theſe unfortunate Creatures. But, be this as it will; certain it is that *Dethardingius*'s Method of affording Relief to drown'd Perſons is highly rational, and promiſes fair for reſtoring them to Life. It conſiſts in four Things; the Firſt of which is, to place the Body drawn from the Water in a proper Poſture and Situation. The Second is to compreſs the Abdomen, at the ſame Time that Frictions are making on the Back. The Third is, to excite an Irritation in the Throat; and the Fourth, to make an Inciſion in the *Arteria Trachea*.

As for the Situation of the Perſon taken from the Water, we have already ſhewn Suſpenſion by the Heels to be prejudicial; tho' *Becker* recommends it becauſe he thinks the Weight of the abdominal Viſcera may thruſt the Diaphragm into the Breaſt, compreſs the Lungs, and giving a greater Spring to the Air, make it act with ſuch an Effort, as to raiſe the *Epiglottis*: But the judicious *Dethardingius*, ſenſible that this Method is ſufficient to deſtroy Reſpiration in Perſons alive, abſolutely condemns it, and orders drown'd People to be laid with their Bodies ſo declining, as that the Head may be loweſt. Beſides, as he had obſerv'd that Reſpiration is more difficultly perform'd on the Belly, he directs drown'd Perſons to be laid on their Backs, and a ſtrong Compreſſion of the Abdomen to be made, from the Region of the Pubes, as far up as

the Stomach. He adds, that it is expedient, both for the Sake of the Frictions and the Compreſſion, to rub the Hands with ſome Oil, proper to reſtore to the Fibres, render'd rigid by the Cold and Spaſms, that Suppleneſs and pliant State, which is neceſſary to them in order to perform the Motions of Reſpiration.

Pechlinus obſerves, that in *Sweden* it is cuſtomary to uſe Frictions on Perſons taken out of the Water, and externally to apply hot and ſpiritous Remedies in order to reanimate the internal Heat, and more effectually excite the Efferveſcence of the Blood. *Borelli*, in *Hiſt. Cent.* 2. *Obſ.* 11, orders the Skin to be render'd red by Means of Frictions in a warm Bed. Mr. *Joly*, a Phyſician of *Britany*, in the Obſervations inſerted in the Hiſtorical Journal, for the Month of *November* 1743, adviſes Frictions before a large Fire with hot Cloths, with a View to reſtore the Perſon to Heat as ſoon as poſſible. *Dethardingius* orders theſe Frictions to be made from the Nape of the Neck down to the Buttocks, becauſe the Heads of the Muſcles, ſubſervient to Expiration, are attach'd to the Spine of the Back, and their Tendons to the Ribs; and becauſe, in his Opinion, Friction facilitates the Action of theſe Muſcles, eſpecially when made with Oils, which contribute to reſtore the Pliancy of the Fibres.

Beſides Frictions before a Fire, with hot Cloths ſoak'd in Oils or ſpiritous Liquors, are beneficial in another Reſpect, becauſe the Spine of the Back is the Origin of a great Number of Nerves, and conſequently of the various Motions perform'd in the Body. This cannot fail to put all the vital Springs in Action, by reſtoring Suppleneſs to the nervous and muſcular Fibres, and Motion to the

ſlow circulating, or even totally coagulated Juices. This is the Reaſon, why Frictions and Pumping ſo often prove ſucceſsful in Apoplexies.

We muſt, alſo, obſerve, that *Dethardingius* approves of laying drown'd Perſons on their Bellies over a Hogſhead, or round Veſſel, which is to be agitated, not with a View to make them diſcharge the Water they have ſwallow'd, but to ſhake and compreſs the Abdomen, and thruſt its Contents towards the Diaphragm. But *Foreſtus*, in *Obſervat. Chirurg.* Lib. 6. *Obſ.* 33. & *Obſ. Med.* Lib. 15. *Obſ.* 26, condemns this Expedient as well as that of Hanging by the Heels, "becauſe, ſays "he, it has produc'd ſudden Death in ſome Per-"ſons who could not bear the violent Motion, "the Turning the internal Parts of the Body "topſy-turvy, and the Agitation of the Head, "and Vomiting produc'd by this Means." Mr. *Joly* alſo condemns the putting drown'd Perſons in a Hogſhead open at both Ends, in order to be roll'd for ſome Time in different Directions.

Dethardingius ſeems not to have laid great Streſs upon the *Swediſh* Practice of defending the Bodies of drown'd Perſons from the Contact of the Air, and of conveying them into warm Places. The firſt Step however taken by the *Swedes* is, according to *Pechlinus*, to wrap ſuch Bodies up in warm Cloths. *Langelotti* alſo, in *Miſcel. Nat. Curioſ. An.* 6. *Obſ.* 20, informs us, that this Method is among them univerſally put in Practice, becauſe they have learn'd from long Experience, that no drown'd Perſon recovers, if he is left long expos'd to the free Air. Mr. *Joly* is, alſo, of Opinion, that drown'd Perſons ſhould be left upon the Shore no longer, than is neceſſary to pull off their Cloaths, which may be cut off for the Sake of Expedition; "for, continues he, a ſingle Moment

"often

" often determines between a State of Death or " Life. In conſequence of this Principle, he adopts the *Swediſh* Practice; " for, *ſays he*, when " the drown'd Perſon's Cloaths are taken off, he " is to be wrapt up in the warmeſt Coverings or " Cloths which can be then had. Then he is to " be convey'd to the neareſt Houſe, where, after " Frictions before a warm Fire with hot Cloths, " he is to be laid in a very warm Bed. Great " Care is to be taken, to apply to his Feet, the " Inner-ſides of his Thighs, his Houghs, and his " Arm-Pits, Flaggons full of boiling Water, " wrapt up in linen Cloths." For the ſame Purpoſe we may make uſe of Bricks. I muſt, however, obſerve, that Mr. *Joly* recedes from the *Swediſh* Practice, in a Circumſtance which to me appears to be of the leaſt Importance; for the *Swedes* do not warm the Bodies of drown'd Perſons ſuddenly, but by little and little, before a gentle Fire. The Expedience of this may be evinc'd by conſidering the Effects of a too intenſe Heat upon Fiſhes found frozen in the Winter Time, which indeed recover for a Moment, and then die irretrieveably. *Nymman* and *Ranchin* alſo order'd drown'd Perſons to be laid in warm Places, eſpecially in Winter.

As, in drown'd Perſons, a Defect of reſpirable Air produces a Suffocation, ſo it would be no leſs fooliſh, than barbarous, ſuddenly to expoſe them to the entire Action of the Atmoſphere, ſince that Fluid, entering precipitately into the Thorax, would produce in the pulmonary Veſſels a Dilatation, which, inſtead of promoting the Paſſage of the Blood thro' that Organ, would produce a freſh Obſtruction in it, becauſe the Action of the Heart is not ſtrong enough to ſurmount the Reſiſtance which the Air makes to the Paſſage of the Blood;

Blood; and this muſt the more inevitably happen, becauſe the Lungs in ſuch a State collapſe, which is the unavoidable Fate of all Fibres depriv'd of the Influx of the Animal Spirits, which neceſſarily depends on the free Conveyance of the Blood thro' the whole Body, and the Velocity of its circular Motion. The Precaution, therefore, of wrapping Perſons taken from the Water in Blankets, is highly proper, and excellently ſuited not only to this Species of Suffocation, but alſo of all others.

But it is not ſufficient to guard drown'd Perſons againſt the rude Impreſſions of the Atmoſphere, ſince 'tis alſo requiſite they ſhould only be permitted the free Uſe of that Fluid by Degrees.

As the Decreaſe of the Circulation is neceſſarily ſucceeded by a proportionable Diminution of Heat, ſo 'tis juſtly to be expected, that the Bodies of drown'd Perſons have loſt the greateſt Part of that Warmth, which is ſo neceſſary to the Support of Life. Hence 'its abſolutely requiſite they ſhould be warm'd. But it would be equally pernicious ſuddenly to expoſe them at once to the Fire, or precipitately to exhibit Medicines, which, by the Volatility of their Principles, might produce a Rarefaction of the Blood. 'Tis, therefore, far more ſafe and prudent to begin with gradually augmented Frictions of the Extremities with warm Cloths, than all at once to expoſe ſuch Perſons to the Fire, or call in the Aſſiſtance of hot and volatile Medicines, both of which may be ſafely, tho' ſparingly and gradually us'd, when the Circulation is ſo reſtor'd, that their bad Effects are no longer to be fear'd.

Theſe Precautions are founded on phyſical Reaſon which, tho' ſufficiently known to Phyſicians,

may yet afford freſh Pleaſure and Entertainment to Readers of another Claſs.

The Blood, then, of the *Vena Cava* diſcharges itſelf into the right Auricle of the Heart, whoſe Contraction forces it unto the right Ventricle, which, in its Turn contracting itſelf, propels the Blood into the Pulmonary Artery. That thoſe Operations may be perform'd, 'tis neceſſary the Quantity of Blood, diſcharg'd into the right Auricle, ſhould not over-power its Action; that the contractile Force of the right Ventricle ſhould be ſufficient to propel the Blood in the Pulmonary Artery; and that in this Artery there ſhould be nothing to obſtruct or oppoſe the Diſtribution of the Blood, which ought to be made in it. Now, according to this Theory, the Contractions of the right Auricle and Ventricle are in ſuch Caſes extremely weakened, ſince theſe Muſcles partake of the Relaxation of the whole Syſtem of the Fibres. The Lungs, alſo, collapſe, and conſequently oppoſe the free Circulation of the Blood, or its free Diſtribution thro' themſelves. If, therefore, in affording Aſſiſtance to drown'd Perſons, we ſhould precipitately convey too quick a Motion to the Blood, we ſhould by that very Circumſtance produce invincible Obſtacles to its Circulation, and conſequently make the Means of recalling Life ſubſervient to the Production of irretrievable Death; for the exceſſive Quantity of Blood, which enters the right Auricle, will over-power and ſurmount the weak Force which reſiſts it. Beſides, tho' this Auricle had contractile Force enough to convey the Blood into the Heart, yet the Action of that Muſcle will not be ſufficient to propel the Blood into the Lungs, or at leaſt to ſurmount the joint Reſiſtance made by the collapſed State of the Lungs, and the Air compreſſing their Blood-

Veſſels.

Veſſels. Theſe Methods, therefore, of relieving drown'd Perſons and reſtoring them to Life, are not only founded upon the animal Oeconomy, but are alſo abſolutely neceſſary and indiſpenſable.

'Tis, however, to be obſerv'd, that, when the Circulation begins to be carried on freely, we may, if ſuch Practice is indicated by any preſſing Circumſtances, attempt to reduce it to its natural State, by means of Cordials and anti-apoplectic Medicines; tho' theſe, eſpecially the latter, as being moſt powerful, are in the Beginning to be us'd with the utmoſt Caution; and probably the ſafeſt Method is totally to abſtain from the anti-apoplectic Medicines, and to begin with the mildeſt Cordials, whoſe moſt energetic Parts, being diluted in a large Quantity of ſome proper Vehicle, may more inſenſibly mix themſelves with the Maſs of Blood, and conſequently produce their Effects more ſlowly. 'Tis, however, to be obſerv'd, that the ſame Danger is not to be dreaded from the external Uſe of the moſt efficacious Remedies. Thus, for Inſtance, we need not heſitate to apply Topics to the Temples, the Noſtrils, the Wriſts, the Pit of the Stomach, and all thoſe Parts, where the Arteries, lying near the Surface of the Body, are expos'd to their Action and Influence. And, as the Membranous Parts are none of the leaſt conſiderable Inſtruments of the ſeveral Motions perform'd in the Body, ſo a very particular Regard ought to be had to them: Frictions, then, of the Hands and Feet, as well as the Application of ſpiritous Medicines to theſe Parts, are extremely beneficial; for, tho' the Propriety of this Practice could not be demonſtrated from Anatomy and Phyſiology, yet we might be fully convinc'd of it, by the Obſervation of *Deventer*, who orders Frictions with Bruſhes to be made on the Soles of the Feet of

ſuch new-born Children, as diſcover no Signs of Life, in order to reſtore the Circulation of the Blood, which is the Foundation or firſt Beginning of it.

Deventer does not, indeed, adviſe the Application of ſpiritous Medicines to theſe Parts; but as 'tis ſufficiently certain, that theſe, as well as all other Liquors, penetrate the Surface of the Body, and enter the Cavities of the Veſſels, ſo their external Applications muſt neceſſarily produce very happy Effects. Beſides, this Method of uſing ſpiritous Medicines is of all others the ſafeſt; not only becauſe their Mixture with the Blood is not ſo quick as when they are exhibited internally, but alſo, becauſe the Parts to which they are applied are moſt remote from the Center.

But we now proceed to conſider the other Methods of affording Relief to drown'd Perſons, beginning with the Smoke of Tobacco, the happy Effects of which are prov'd by various Obſervations. Thus Doctor *Mead*, in his mechanical Account of Poiſons, after mentioning that many, who have been drown'd and dead to all Appearance, have been ſurpriſingly reſtor'd to Life, ſpeaks in the following manner, from the Memoirs of the Royal Academy of Sciences: "This Circumſtance ſhould "certainly encourage the Uſe of all Means, upon "ſuch Accidents, eſpecially as the Trial is not dif-"ficult. The firſt Step ſhould be to blow the Smoke "of Tobacco up into the Inteſtines, then to warm "the Body by ſhaking and rolling about, and rub-"bing it with warm Cloths in a Bed. In a Word "to put the Blood into Motion all manner of "Ways, and not to be diſcourag'd tho' no Signs "of Life ſhould be diſcover'd after an Hour or "two ſhould be ſpent in this good Work; towards "the latter End of which, Spirits and volatile "Salts may produce a good Effect. Neither

"ſhould

" ſhould Bleeding be omitted, when the Blood is
" become ſufficiently warm to drop out of the
" Veins."

The happy Effects of the Smoke of Tobacco, in reſtoring drown'd Perſons to Life, are farther evinc'd from the following Narration of Dr. *Bruhier*: Mr. *Thomas* a profeſs'd Surgeon of *Paris*, being at *Paſſy*, waited in a Boat till the Number it was to take in ſhould be completed. During this Time, he ſaw a Boat croſſing the River, and, when it arriv'd at Land, one of the Paſſengers ſtepping aſhore, and miſſing his Wife, aſk'd what was become of her; but no one could give him any Anſwer, except a young Child, who, pointing to the River, ſaid, ſhe had hid herſelf in it. This Woman had fallen from the Stern of the Boat, without being perceiv'd by any of the Paſſengers, except the Child, who gave Directions to row to the very Part where the Woman fell from the Boat. The Huſband finding her in a Place which was not very deep, but full of Mud, brought her to Land, and laid her out. Whilſt ſome of the Spectators of this melancholy Accident were adviſing to hang her by the Heels, and others ordering different Meaſures to be taken, a Soldier, with his Pipe in his Mouth, came to aſk the Reaſon of ſuch a Concourſe of People; upon being inform'd of the Accident, he deſir'd the diſconſolate Huſband to give over weeping, becauſe his Wife would return to Life very ſoon. Then giving his Pipe to the Huſband, he bid him introduce the ſmall End of it into the Anus, put a Piece of Paper perforated with a large Number of Holes upon its Mouth, and thro' that blow the Smoke of the Tobacco into her Inteſtines, as ſtrongly as he poſſibly could. Accordingly, at the fifth Blaſt, a conſiderable Rumbling in the Woman's Abdomen was heard, upon which

which ſhe diſcharg'd ſome Water from her Mouth, and in a Moment after return'd to Life. This Practice, however inſignificant in the Eyes of the Vulgar, is nevertheleſs of the higheſt Importance; for the Irritation of the Inteſtines, excited by the Heat and Acrimony of the Smoke of the Tobacco, produces, in the Muſcles ſubſervient to Expiration, ſuch a Reflux of the animal Spirits, as induces a Contraction of them ſufficient to ſurmount that Reſiſtance which the Air, contain'd in the Breaſt, found to its Diſcharge. This happy Effect of the Smoke of Tobacco is ſufficently evinc'd by the preceding Hiſtory, ſince it made the Woman vomit up the Water ſhe had ſwallow'd. Now Vomiting is excited by a ſtimulating Contraction of the Diaphragm, and of the tranſverſe Muſcle of the Abdomen, which, contracting the Stomach, force it to diſcharge its Contents, where the leaſt Reſiſtance is found, and conſequently by its ſuperior Orifice. It is to be obſerv'd, that the ſame happy Effects are produc'd by the Smoke of all acrid Subſtances, ſince Mr. *Joly* affirms, that the ſame End is equally anſwer'd by the Smoke of Sage, and other Plants of a ſimilar Nature. It is alſo highly probable, that Clyſters, prepar'd with Coloquintida or Tobacco, would produce Effects equally good; but, on ſuch Occaſions, the moſt ready and expeditious Meaſures are always to be taken, ſince a very ſmall Delay may prove of the laſt Conſequence, by deſtroying a Life which might otherwiſe be preſerv'd.

In Caſes of Emergency, where proper Inſtruments are not immediately to be procur'd, the Preſcription of the Soldier, in the preceding Hiſtory, may be follow'd; but it may loſe leſs Time to cover the Tobacco in the Bole of the Pipe, when lighted, with a ſilk Handkerchief, either ſingle,

or

or once doubled, than to wait till proper Holes are bor'd in a Piece of Paper, tho' this takes up very little Time. However, that no neceſſary Inſtructions might be wanted, I have given the Figure of an Inſtrument, contriv'd on purpoſe for impelling the Smoke of Tobacco into the Inteſtines. A. repreſents a Braſs or Iron Box, capable of containing half an Ounce of the ſtrongeſt Tobacco, which is to be lighted. B. is a common Clyſter Pipe, to be introduc'd into the *Anus*, join'd to the flexible Tube D. D. made of Leather. C. is another Pipe, at which a Perſon blows forcibly, that the Smoke of the Tobacco in the Box A. may be impell'd thro' the flexible Tube D. D. and the Pipe B. into the Inteſtines. E. repreſents the Smoke. If one Clyſter is not ſufficient, another ſhould be given ſoon after, and repeated till it anſwers.

Theſe Clyſters of the Fume of Tobacco are of excellent Uſe in the Iliac Paſſion, and in an incarcerated Hernia; and no Apothecary or Surgeon ought to be without ſuch an Inſtrument.

As the olfactory Nerves are of all others the moſt expos'd to the Action of Bodies, and have an intimate Connexion with thoſe ſubſervient to the Motion of the Muſcles deſtin'd for Reſpiration, it muſt of courſe be beneficial to irritate the Nerves of the Noſe; ſo that what we call Sternutatories, of ſuch Subſtances as excite Sneezing, produce happy Effects in reſtoring drown'd Perſons to Life: *Indian* Marum or Euphorbium introduc'd into the Noſe, or reduc'd into a Powder and blown up the Noſtrils, will in all Probability produce ſalutary Effects, ſince if they operate they will excite a violent Expiration, ſufficient to remove all thoſe Obſtacles which the Air finds to its free Diſcharge. Mr. *Joly* warmly recommends this Practice, as alſo Injections of ſpiritous Liquors. Thus the

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Injection of Spirit of Sal Ammoniac into the Noſtrils operates more powerfully, than holding volatile Sal Ammoniac to them. Perhaps Vinegar will ſtimulate yet more ſtrongly, and with better Effect.

All thoſe Authors, who treat of the Meaſures proper for reſtoring drown'd Perſons to Life, order a Vomiting to be excited, in order to procure a Diſcharge of the Water contain'd in the Stomach. This is the Doctrine of *Codronchus*, *Foreſtus*, *Camerarius*, and Mr. *Joly*, who imagine that the Water in the Stomach of drown'd Perſons is one of the Cauſes of their Death. In order to excite this Vomiting, they order the Throat to be tickled with the bearded End of a Quill. *Becker* and *Dethardingius* order a Feather to be introduc'd into the Oeſophagus, in order to excite ſuch a Motion of the Epiglottis, as is ſufficient to procure a Diſcharge of the Air contain'd in the Breaſt. Now 'tis ſufficiently known to every Body, that the bearded End of a Quill excites Vomiting. We muſt here obſerve, that Mr. *Joly* only orders Vomiting to be procur'd after drown'd Perſons return to Life. But it is certain, that Vomiting can produce no happy Effects, if there is nothing in the Stomach, or only a Quantity of Water equal to that daily us'd by moſt People. As for liquid Emetics, their Effects appear to be highly dubious, ſince the Oeſophagus may poſſibly be in ſuch a convulſive State, as to hinder Deglutition. *Dethardingius* looks upon this Irritation of the Throat, as a Circumſtance of the higheſt Importance; but, for exciting it, prefers a certain Inſtrument invented in *Germany*, and deſcrib'd by *Heiſter* in his Surgery.

According to *Pechlinus*, the *Swedes* attempt to reſtore the Lives of drown'd Perſons, by Means

of

of Fomentations, with anti-apoplectic Medicines; that is, such as are of an hot and spiritous Nature. *Borelli* in *Obs.* 11. *Cent.* 2. informs us, that he successfully us'd toasted Bread soak'd in warm Brandy, applied to the Region of the Heart, and frequently renew'd. *Nyman* in *Tr. de Apoplexia. Cap.* 44. orders us to apply to the Nostrils of drown'd Persons odoriferous Substances, and such as are capable of putting the Spirits in Motion, and restoring the Action of the Heart, and the Functions of the Brain. Of this Kind are Penny-royal, Rue, and Lilly of the Valley, soak'd in Vinegar. He, also, orders us to apply to the Region of the Heart Epithems prepar'd of Baum, Rue, Marjoram, Amber, Cinnamon, and Lavender. Thus for Instance:

Take of the best Rose-Water an Ounce and an half; of Baum-Water two Ounces and an half, of Rosemary-Water one Ounce; of Malmsey Wine one Ounce and an half; of Lemon Juice one Ounce, of the Powder of Cloves one Scruple; of Theriaca one Dram, and of Camphire and Saffron each half a Dram. Mix all together, and in the Liquor soak a Spunge, to be applied to the Region of the Heart.

As the genital Parts of both Sexes have a near and intimate Correspondence with the Heart, as is obvious from the Effects of Cordials, applied to those Parts, in Syncopes, Faintings, and other Affections of the Heart, so *Nymman*, in order to restore drowned Persons to Life, orders these Parts to be fomented with warm Wine, in which Cinnamon, Cloves, Musk, and Baum have been boiled.

But, if any Success is to be expected from these Remedies, it is principally, when, by the Assistance of Frictions, the most volatile Parts of Spiritous Liquors are made to penetrate into the Mass of

luids; and it is highly probable, that, indepen-dently of the Experience of the *Swedes*, this Method will anſwer the End propoſed by *Dethardingius*, which is, the procuring of a free Expiration; for, if the Admixture of the ſpiritous Parts of cordial Liquors reſtores the Courſe of the Spirits and Blood, it muſt neceſſarily follow, that both muſt be more copiouſly conveyed to the Muſcles deſtin'd for the Purpoſes of Expiration.

It is alſo certain, from Experience, that one of the moſt efficacious Expedients, for reſtoring drown'd Perſons to Life, is ſpeedy Veneſection, eſpecially in thoſe Parts moſt proper for relieving the Head, as the Ankles, for Inſtance, and the Jugular Veins. The Uſe of Veneſection, in ſuch Caſes, muſt be ſufficiently obvious to every one who conſiders, that drowned Perſons, as well as thoſe who are hang'd, die of an Apoplexy of the ſanguineous Kind, and not for Want of Reſpiration, or, as is commonly imagined, on Account of a Repletion, or Choaking up of the Breaſt by Blood; for, when ſuch Perſons are laid open, the Breaſt is found almoſt entirely void of Blood, and the Brain extremely inflamed; both which Phænomena are highly agreeable to the Laws of the Circulation.

Theſe are the moſt common and approved Methods of reſtoring drown'd Perſons to Life; but, if they ſhould happen to prove ineffectual, the laſt Reſource is, what we commonly call *Bronchotomy*, or *Tracheotomy*, which conſiſts in opening the *Trachea*, in order to procure a free Acceſs of the Air to the Lungs. This Operation is principally intended to remove the obſtinate Adherence of the Epiglottis to the Orifice of the Glottis; in conſequence of which Circumſtance, the Air contained in the Lungs is freely diſcharged. Tracheotomy was indeed originally intended for the Extraction of foreign Bodies from the *Trachea*, or

for the procuring an Acceſs of the Air to the Lungs, when the Inflammation of the Muſcles of the *Larynx* is ſo conſiderable in Quinſeys, as to cloſe up the Aperture of the *Glottis*.

Tracheotomy, according to *Dethardingius*, has all the Advantages which can be wiſhed for, ſince it affords Relief *ſpeedily*, *effectually*, and *agreeably*: *Speedily*, becauſe there is no more expeditious Method of procuring a Diſcharge of the Air, which, by its natural Spring, and by the continual Compreſſion of the Abdomen, muſt neceſſarily be evacuated in that Manner. Now the Air cannot eſcape from the Pulmonary Veſicles, without their collapſing and expreſſing into the Pulmonary Vein the Blood which had entered the Pulmonary Artery, which cannot happen, without adding a greater Facility of Circulation to the arterial Blood. Now the Blood arriving at the left Auricle, and thence at the left Ventricle, produces a new Contraction of the Heart; upon which the Circulation is reeſtabliſhed, and Life diſcovers itſelf by manifeſt Signs, eſpecially by Reſpiration.

Tracheotomy, alſo, affords Relief without Danger, becauſe we are no longer afraid of making an Inciſion in thoſe Cartilages, which the Ancients, in Conſequence of their bony Nature, imagined incapable of Conſolidation. We no longer dread the Hemorrhage, ſince only a few Drops of Blood are diſcharged in opening the Membrane, which unites the Ringlets of the *Arteria Trachea*; and ſince there are not contiguous to the Part ſuch large Blood Veſſels, as being wounded would produce terrible Effects. There is no Danger of injuring the Voice by means of this Operation, ſince the Operator cannot hurt the Muſcles of the *Larynx*; and ſince there are no Nerves, the Dilaceration of which ſhould impair or deſtroy the Senſation of the Part.

In a Word, it is no difficult Task to heal up and conſolidate the Wound, for this is readily effected by means of a Plaiſter, or ſome balſamic Ointment.

Thirdly, *Tracheotomy* affords Relief *agreeably*, for it cannot poſſibly be painful to a drowned Perſon, whoſe Senſes are ſo locked up, as to render him incapable of feeeling Pain. Thus the Operation is performed, without being intercepted by the Cries, the Groans, and Motions, which Pain would produce.

Paulus Ægineta is the firſt Author extant, who deſcrib'd the Operation of *Bronchotomy*, from *Antyllus*. But the judicious and accurate *Heiſter*, in his Surgery, deſcribes this Operation very diſtinctly. The Words *Bronchotomy*, ſays he, *Laryngotomy*, and *Tracheotomy*, are convertible Terms, and mean no more than an Inciſion of the *Aſpera Arteria*, or what we commonly call the *Wind-Pipe*; and indeed various Cauſes and Circumſtances concur, to render this Operation abſolutely neceſſary on ſome Occaſions; for, in the firſt Place, it becomes principally and indiſpenſably ſo, when in a Quinſey the Fauces are ſo terribly inflamed, that the Patient is in imminent Danger of having his Reſpiration quite ſtopt, and a total Suffocation brought on. *Secondly*, It becomes neceſſary, when a Bean, a Prune, a Cherry-ſtone, a Pea, or any other extraneous Subſtance falls into the *Aſpera Arteria*, and ſeems to threaten a Suffocation. *Thirdly*, The *Aſpera Arteria* is alſo to be opened, in ſuch Perſons as have been ſuffocated, in Conſequence of their being immers'd in Water, or as we commonly expreſs it, in newly drowned People; for Reſpiration has been often reſtored to Perſons in this Condition, by opening the *Aſpera Arteria*, and by that means procuring a free Acceſs of the Air to the Lungs. I am ſufficiently appriz'd, that a great many forbid making

king an Incision in the *Aspera Arteria*, and consequently condemn this Operation; because they think it productive of Death, and are therefore prompted by any idle Zeal to brand the Physicians, who approve an Operation, so dangerous in their Eyes, with the odious Appellations of barbarous and inhuman. But the Gentlemen, who are of this narrow and confined Way of Thinking, are grosly mistaken; for, in this Operation, the small Incision made in the *Aspera Arteria* is so far from killing the Patient, that it does not produce that Effect when made considerably large; and *Garengeot* gives Examples of various Cures performed by this Operation; so that we think ourselves authoriz'd with *Casserius, in Tr. de Vocis Auditusq; Organis*, to pronounce those Men unskilful, timorous, and even cruel, who in the Cases now mentioned, foolishly neglecting this Operation, which is not only safe, but also attended with the most speedy and salutary Effects, suffer the Patients to die for Want of this seasonable Assistance. Instances of this Nature may be seen in *Nicolai Fontani Observat. Rarior. Analect.* and in *Casserius*.

When *Bronchotomy* is to be perform'd, that Part of the *Trachea* seems most proper for making the Aperture in, which is situated between its second and third cartilaginous *Annuli*, or Ringlets. The Incision may, however, be made a little lower, without any Danger. The Method of performing the Operation, especially when a foreign Substance falling into the Aspera Arteria, and threatening a Suffocation, is to be extracted, is thus: The Patient is first of all to be situated in a reclining Posture, either in Bed, or in some convenient Chair, and his Head is to be held firm by an Assistant standing behind his Back. Then a longitudinal Incision is to be made, thro' the Skin, Fat, and Muscles,

from

from about two Fingers Breadth below the *Cartilago Thyreoides*, or *Scutiformis*, or the *Pomum Adami*, in the middle of the *Trachea*, down to the very Sternum, ſo that the Length of the Inciſion may be two, three, and, in all Patients, four Fingers Breadth in Length.

Then an Aſſiſtant is carefully to draw the Lips of this Orifice from each other, either with proper Hooks, or with his Fingers; and having abſorb'd and wip'd away the Blood, either by a Spunge or Linnen Cloth, ſo that the *Aſpera Arteria* may be ſeen, three or four of the Annuli or Ringlets of that ſpiral Pipe are to be cut in ſuch a Manner, that the Inciſions, made in the Whole, may form one continued Line; and thus whatever Subſtance may have ſlipt into it, is to be artfully and cautiouſly extracted, either by a Probe, Hook, or Forceps. This being done, the Wound is to be cleans'd with a Spunge, and, its Lips being kept in Contact by adheſive Plaiſters, a proper Compreſs and Bandage are to be applied. It is afterwards to be carefully agglutinated, by means of vulnerary Balſams, as in other Wounds of the *Aſpera Arteria*. By this very Method, continues *Heiſter*, I myſelf, in *Helmſtadt*, happily extracted a Piece of boil'd Muſhroom from a Patient, who happening to laugh while he was ſupping Broth, in which among other Things there were Muſhrooms, had the Misfortune to have a Piece of one of them ſlip into his *Aſpera Arteria*, by which means he was in Danger of being ſuffocated. *Pavius*, continues *Heiſter*, alſo inform'd me, that, by this very Method, he happily extracted a Bean from the Throat of a Patient. Some, in order to induce a more ſpeedy and ſeemly Cicatrix on the Wound, recommend Conglutination by Suture as in the Hare Lip: But 'tis certainly abſurd to follow a Practice attended

with

with ſo much Pain to the Patient, whilſt Methods equally good, and at the ſame Time far milder, may be purſu'd.

But in all Caſes where a Suffocation is either dreaded, or actually preſent, *Tracheotomy* is abſolutely neceſſary, and may be perform'd in three different Manners. In the firſt of theſe the Patient is to be plac'd in a Bed or Chair, with his Head reclin'd at the Operator's Diſcretion, and held firm by an Aſſiſtant, as before directed. Then let the Surgeon make an Inciſion in that middle Part of the Throat, and in the ſame Manner as before order'd, till he reaches the *Trachea* itſelf, if he thinks proper; the Skin on both Sides is to be laid hold of by the Aſſiſtant; then it may be rais'd and cut longitudinally. After theſe Meaſures are taken, the Fat and Muſcles lying above the *Trachea* are to be cut. Some would have theſe Muſcles firſt diſengag'd from the *Trachea*, or cautiouſly ſeparated from the others; but there is no Occaſion for all this Labour, ſince they may be cut ſafely and without any Danger. Then the Operator is to cleanſe the Wound with a Spunge wrung out of warm Wine, or warm Spirit of Wine for ſtopping the Blood more effectually. The Aſſiſtant is, in the mean Time, to ſeparate and retract the Lips, either by Hooks, or by his Fingers. Then the Surgeon is to paſs his Knife between two of the Annuli of the *Trachea*, or he may even paſs it in ſuch a Manner as to cut one of them, ſince by that means a ſilver or leaden Pipe either round or flat, furniſh'd with *Anſæ*, or a Rim, ſo as to prevent its falling into the *Trachea*, may be conveniently inſerted into the Wound. But, before the Surgeon withdraws his Knife, ſome proper Probe ought to be inſerted in the Wound, by the Side of the Knife, that by its Aſſiſtance a Pipe may be more commodiouſly and eaſily

put into it. This Pipe is fix'd in the Wound by means of a Ligature pass'd thro' its Annuli or small Holes in the Rim, and carried round the Neck, as also by means of a perforated adhesive Plaister: But great Care is to be taken that the End of the Pipe which is inserted into the Wound be not permitted to touch the posterior Part of the *Aspera Arteria*, lest by this means a troublesome Cough should be excited. But that the Lungs may not be injur'd by external Cold, or any Filth falling upon them, it is highly proper to lay upon the Pipe a Spunge, often impregnated with warm Wine, and again wrung out; or, as *Garengeot* advises, a thin Linnen Cloth, and afterwards a perforated Plaister. These Directions being duly observ'd, Blood is to be taken either from the Veins of the Neck or Feet, those under the Tongue, or those situated in the Neck. When Respiration is totally restor'd, which is most quickly discover'd by stopping up the Pipe with one Finger, the Pipe is to be taken out, and the Wound agglutinated in the Manner above directed. But, when the Difficulty of Breathing at the Mouth is considerable, the Pipe is to be left for some Time longer in the Wound, and the other Medicines continued.

Another and more expeditious Method of opening the *Trachea* is this: A two-edged Knife is applied to the abovemention'd Part of the Throat, and cautiously pass'd thro' the Skin, Fat, and Muscles, into the Cavity of the *Trachea* itself, and a Pipe is forthwith inserted into the Wound, and carefully secur'd in the Manner before directed. This Manner of Operation is not only quicker, but also produces a smaller Cicatrix than the former.

The third, and last Method of performing this Operation is, with an Instrument call'd a *Trocar*, us'd

in tapping for the Dropsy, which no Surgeon ought to be without. This Instrument, applied to the Middle of the *Trachea*, may, as it were, at one Thrust be pass'd through the Skin, Fat, and Muscles, into its very Cavity. Then taking out the perforating Part, let the Pipe remain in the Orifice till the Patient recovers. This Method of Operation seems, in one Respect, to have the Advantage of all the rest, which is, that it is soon over and the Pipe at the same Time introduc'd into the Wound with far less Pain to the Patient, than by any other Method: But even in this Case the same Caution ought to be us'd, and the same Directions follow'd, which we have above specified.

If Persons drown'd, continues *Heister*, are but just dead, their *Aspera Arteria* is to be open'd with all Expedition, either with an Incision-knife, or any other Instrument the Surgeon shall judge proper. Then it is expedient strongly to blow into the Orifice, either with the naked Mouth, or by Means of a common Pipe, the Shank of which is to be introduc'd into the Wound, whilst the Assistant blows into the Bole. The learned *Dethardingius*, in a Dissertation on this very Subject, informs us, that by this Method, if speedily put in Execution, Life returns to the suffocated Patient, with the injected Air, and that he is in a Manner miraculously rais'd from the Dead. For this Reason the Operation should in such Cases be perform'd with the greatest Haste and Expedition imaginable.

Mr. *Sharp* our Countryman, in his Surgery, assures us that this Operation is absolutely void of all Danger, and describes it in the following Manner:

Bronchotomy is perform'd, by making a longitudinal Incision thro' the Skin, three Quarters of an Inch long, between the third and fourth Rings,

lets of the *Trachea*, when the Operator has his own Choiceof the Place; it is always advis'd to pinch up the Skin in this Operation, which however may be left to the Diſcretion of the Surgeon, who, when the Skin is cut thro', muſt make a ſmall tranſverſe Inciſion into the Wind-pipe, and immediately introduce a crooked *Canula*, near half an Inch long, of Silver or Lead, with a Couple of little Rings at the Top of it, thro' which a Rib-band may be paſs'd round the Neck, to keep it fix'd in the Wound.

Some have preſcrib'd making an Inciſion thro' the Skin and Trachea at once, with a Lancet or Knife, as the more eaſy and expeditious Manner, and ſays the Author, I once ſaw it performed in this Way, but it prov'd very inconvenient; for the Wind-pipe, in Reſpiration moving up and down, ſlipp'd from the Orifice of the Skin, and made it very difficult to introduce the Canula, and afterwards maintain it in its Situation. Wherefore I think it abſolutely neceſſary to make an external Inciſion longitudinal, and even pretty large, as I have directed above.

The Caution of raiſing the Sternohyoidei and Sternothyroidei Muſcles before opening the Wind-pipe is not to be regarded; and as to the Diviſion of the recurrent Nerves, and large Blood Veſſels, ſo much dreaded in this Operation, 'tis not in the leaſt to be fear'd, ſince they are quite out of the Reach of the Inſtrument, as any Perſon, ſkill'd in the Anatomy of theſe Parts, muſt very well know.

The Method of dreſſing is eaſily underſtood; ſince, after the Patient can breathe by the natural Paſſage, if we withdraw the Pipe, the Wound becomes a ſimple one, and notwithſtanding its Penetration thro' a Cartilage, into a large Cavity, requires only a ſuperficial Application.

Upon

Upon the Whole it appears beyond all Contradiction, that *Bronchotomy* is a ſafe Operation, and has been ſo often perform'd with Succeſs, that no Surgeon has any Reaſon to heſitate in performing it, in Caſes where particular Circumſtances indicate its Propriety. For this Reaſon 'tis ſufficiently obvious, that this Operation ought with all Expedition to be perform'd on drown'd Perſons, many of whom have been happily reſtor'd to Life by this very Means. It is carefully to be obſerv'd, that this Expedient is far more efficacious than blowing into a Perſon's Mouth, as is confirm'd by the following Experiment made by *Becker*. This Phyſician hang'd a Dog, till no more Motion of his Heart was perceiv'd, and, having left him dead on the Ground for half a Quarter of an Hour, he to no Purpoſe blow'd Air into his Throat. Then he perform'd the Operation of *Bronchotomy*, and, having thrice blown the Air into his Lungs, the Breaſt of the Dog began to elevate itſelf, and at the fifth Blaſt he mov'd his Feet. After this he was blooded in the Throat to give Vent to the Blood, and at laſt gave ſome howling Barks, but ſurviv'd the Accident for ſeveral Years. Now as the Cauſe of Death is the ſame in drown'd as in hang'd Animals, why ſhould not the ſame Means reſtore them both to Life?

I have been very particular with reſpect to the Operation of *Bronchotomy*, becauſe it is of great Importance, and of ſingular Uſe in more Caſes than one; and that no one might be ignorant of the Methods of performing it. In the Caſe before us, that of drown'd Perſons, it may frequently be neceſſary where no Surgeon is to be procur'd ſoon enough to retrieve the Misfortune and preſerve Life. In this Situation, as there is no great Danger of injuring a Perſon, who appears to be dead, and muſt be

abſolutely ſo without immediate Relief, any common Perſon, tho' not bred a Surgeon, may, by theſe Directions, be enabled to perform the Operation, by making a Perforation in the Place above directed, with any ſharp-pointed Knife. Then inſtead of a Canula or Tube of Metal, if that is not at hand, a Tobacco Pipe may be broken about three Quarters of an Inch, or an Inch, from the Bole, and the Part contiguous to the Bole may be introduc'd into the Perforation, taking Care not to break it within the *Trachea*; and then, by blowing into the Bole, the Lungs may be inflated.

After having thus collected every Thing of any Importance upon the preſent Subject, we muſt beg Leave to obſerve, that tho', with Reſpect to Matters of Religion and Conſcience, it is not only extremely abſurd, but alſo highly cruel and barbarous to invoke the Aſſiſtance and Interpoſition of the ſecular Power: Yet, in the preſent Caſe, ſuch an Attempt is ſo far from being either abſurd or barbarous, that it beſpeaks Compaſſion and Humanity; for we may ſafely appeal to Experience how many worthy Members of Society, generous Friends, affectionate Huſbands, tender Parents, and dutiful Children have in foreign Countries been reſtor'd to Life by theſe very Means; whereas in *England* Perſons of equal Worth, have, for Want of proper Care, been laid in their Graves, at a Time when they might, for many future Years, have prov'd the common Bleſſings of the various Communities of which they were Members.

This melancholy and deplorable Conſideration will ſufficiently authoriſe me to propoſe a Regulation to the Legiſlature of *England*, whoſe principal Aim ſeems ultimately to terminate in the greateſt and moſt extenſive Happineſs of the Subject. It

is,

is, that this Treatment of Persons, suppos'd to be drown'd, may be enforc'd by all the Authority of the Law; and that no one may be suffer'd to be buried without it; and this under severe Penalties; for otherwise I am afraid these Endeavours of mine, however well intended, will not have the desir'd Effect, nor be attended to, so much as the Subject deserves.

AN

APPENDIX.

Concerning the Methods of restoring hang'd Persons to Life, and Children suppos'd to be born dead.

AS *England* is, above all other Nations in the World, justly branded with *Suicide*, commonly known by the Name of Self-murder, and as our Countrymen frequently make Choice of a Rope for that Purpose, we shall briefly point out the Methods of restoring hang'd Persons to Life.

'Tis certain then, that hang'd Persons die of an Apoplexy of the sanguineous Kind, produc'd by an Obstruction of the Blood, by the Rope, in the jugular Veins, whilst the Arteries, being freer from this Compression, continue to convey the Blood to the Brain. We may form a Judgment of the Effects produc'd by a Compression of the jugular Veins from the following Passage of *Alexander Benedictus* in *Lib.* 2. *Cap.* 33. "When, says that judicious Author, a Redundance of Blood ob-

"structs

" ſtructs the arterial and venous Canals, and inter-
" cepts the free Circulation of the Spirits, the Pa-
" tient falls down in the ſame Condition as if he
" was hang'd. The *Aſſyrians* ſometimes put
" ſound Perſons into a ſimilar State, when for In-
" ſtance they intended to circumciſe Adults or
" Children. Thus having laid them on their Backs
" in a Bath, they compreſs their jugular Veins, ſo
" as ſpeedily to produce a Privation both of Moti-
" on and Senſation; and, taking the Advantage
" of this Circumſtance, cut off the Prepuce with
" as much Eaſe as if the Patient was in an Apo-
" plexy. The ſame is the Condition of thoſe who,
" having attempted to hang themſelves, are found
" ſuffocated, tho' their Feet touch the Ground."

Nymman, alſo, in *Tr. de Apoplexia, cap.* 14, declares his Sentiments on this Subject in the following Manner: " The Functions of the Brain, ſays
" he, are deſtroy'd without any Leſion of the a-
" nimal Spirits and Nerves, as appears in a Syn-
" cope. The like happens to hang'd Perſons,
" who are no ſooner hung up, provided an expert
" Executioner exactly brace up the Veſſels of the
" Neck, with the Rope, than they become im-
" moveable as a Log of Wood, without e-
" ven ſo much as moving their Feet, notwithſtand-
" ing which Phænomena, the Brain and Origin
" of the Nerves ſuffer nothing in ſuch Perſons;
" ſince thoſe Parts are defended by the Cranium and
" Vertebræ, which can never be injur'd by the Rope.
" Nor is the Interception of Reſpiration to be ac-
" cus'd as the Cauſe of Death in hang'd Perſons,
" ſince tho' we cloſely ſhut up the Mouth and
" Noſtrils of an Animal ſo as to hinder the Acceſs
" of Air into the Breaſt, yet, as the Brain ſtill re-
" tains its vital Spirit, it powerfully oppoſes the
" imminent Danger of a Suffocation, by a violent

" Agitation

" Agitation of the Body, and an exceſſive Motion
" of the Feet, which Circumſtances are never ob-
" ſerv'd in hang'd Perſons."

From theſe Authorities we evidently ſee the ſpeedy Effects produc'd by the Compreſſion of the jugular Veins. This Doctrine is farther illuſtrated by *Bartholine*, in *Cent.* 1. *Hiſt.* 32, " In diſſecting, " ſays this Author, a Man of a tall Stature, of a " ſanguine Temperament, and vigorous Conſti- " tution, who was hang'd for a Robbery, I found " his Lungs preternaturally large, bluiſh, ſtreak'd " with different Colours, light and ſpungious, and " ſo full of a frothy Blood, that every where on " the Membrance, which covers them, the Veins " not only appear'd turgid, but the Lobes were " alſo ſo large as to embarraſs me in diſſecting the " Heart. The Ventricules of the Brain were full " of Water, as alſo the Origin of the Nerves " which enter the Spine. The *Plexus Choroides*, " alſo, beſides the Inflation of its Veſſels, con- " tain'd a great many Veſicules."

The Loſs of Knowledge in hang'd Perſons, alſo, proves the Truth of this Doctrine, and this Loſs is ſufficiently atteſted by *Camerarius* in *Cent.* 7. *Hiſt.* 40. where we are told, that a Robber being hang'd and falling into the Hands of the Surgeons, for Diſſection, was nevertheleſs reſtor'd to Life, notwithſtanding his Mouth was full of Froth, which is generally look'd upon as an infallible Sign of irretrievable Death, eſpecially where it continues long, as it did in the preſent Caſe, and notwithſtanding he had before his Execution been ſeiz'd with a Fit of Madneſs. When this Man, however, was reſtor'd to Life, he ſaid he remember'd nothing of what had paſs'd on that Occaſion, except that he was conducted to the criminal Chamber, after which he was inſenſible of every Thing. This

Robber

Robber was hang'd a second Time for committing freſh Robberies, a convincing Proof, that he did not look upon the firſt as a formidable Puniſhment. *Camerarius* in *Hiſt.* 38. mentions another, who was twice hang'd; and in *Hiſt.* 39. another who was reſtor'd to Life by the Phyſicians of *Vienna*, after he had been hang'd.

Lord *Bacon*, in his Hiſtory of Life and Death, relates an Accident, which, like that of *Camerarius*, proves the Loſs of Knowledge in hang'd Perſons. A young Gentleman of ſome Diſtinction, curious to know the Pain ſuffer'd by hang'd Perſons, having fix'd a Rope about his Neck, threw himſelf from a low Stool upon which he imagin'd he could eaſily put his Feet again: But his Attempts of this Kind were in vain, and he had been irretrievably ſuffocated, without the Aſſiſtance of a Friend who had the Curioſity to be preſent at ſuch an unaccountable Experiment. Upon his Recovery, his Friend aſked him if he had felt any Pain; he anſwer'd that he had perceiv'd none in any Part of his Body; but added, that at firſt he obſerv'd before his Eyes a Species of Fire or blazing Light; then an extreme Darkneſs, and laſt of all a pale Blue, or a Sea-green, like that which frequently preſents itſelf before the Eyes of thoſe who fall into Deliquiums. Lord *Bacon* ſubjoins, that he heard a Phyſician of Candour and Worth aſſert, that he had reſtor'd Life to a Man who had been hang'd half an Hour, affirming at the ſame Time, that by proper Means the ſame Effect might be produc'd upon others, who had hung no longer, provided the Effort of their firſt Fall had not luxated the Vertebræ of their Necks.

After having thus diſcover'd the Cauſe of Death in hang'd Perſons, we are the better able to form an

an Eſtimate of the Means moſt proper to reſtore them to Life.

Frictions then, and hot Baths, by reſtoring the Motion of the Blood, and reſolving its Coagulation, muſt, for theſe very Reaſons produce happy Effects on hang'd Perſons. *Pechlinus* in *Tr. de Aer. & Aliment. Defect. cap.* 7. relates an Obſervation, which ſufficiently evinces the Efficacy of Sal Ammoniac on ſimilar Occaſions: "I knew, ſays "he, a Woman hang'd, who after ſhe had re"main'd for ſome Time without Pulſe and Reſpi"ration, with her Lips cover'd with Froth, which is "look'd upon as an infallible Sign of the total Pri"vation of Life, and in a Word, after ſhe appear'd "to be the neceſſary Victim of Death, was yet re"ſtor'd to Life, by a Phyſician who, coming acci"dentally to the Place where ſhe lay, made her ſwal"low a conſiderable Quantity of the Spirit of Sal "Ammoniac." As the Activity of this acrid volatile Liquor, and its Propriety to reſolve coagulated Blood, are ſufficiently known, it is by no means ſurpriſing, that it ſhould on ſimilar Occaſions produce ſuch happy Effects. *Pechlinus* ſubjoins, "I "don't in the leaſt doubt, but, if proper Meaſures "were taken in due Time, a great many hang'd "Perſons might be reſtor'd to Life, even after "thoſe, who have an Opportunity of ſeeing them, "think they have all the Reaſon in the World to "conclude them really and irretrievably dead. "This Effect is moſt commodiouſly produc'd by "reſtoring the Circulation of their Blood, by "means of Frictions, Veneſections, and the Ex"hibition of hot and ſpiritous Remedies, or of "analogous Subſtances."

It is ſufficiently eaſy, from what we have before ſaid, to conceive, how Veneſection is excellently calculated for reſtoring Life to hang'd Perſons

and as for ſpiritous Liquors, they act at once on the Blood and Veſſels, by attenuating the former, and reſtoring the proper Spring and Tone of the latter. The Remedies of this Kind are before ſpecify'd.

Schenkius, in *Obſervat. Art. de Suffocat. ex Laqueo*, orders that drown'd Perſons ſhould be made to ſwallow Vinegar and Pepper; or Oxymel mix'd with the Powder of Penny-royal. He, alſo, adviſes to excite a Vomiting by means of a Feather dipt in Oil, and to wrap up the Patient's Neck in a Woollen Cloth dipt in warm Oil, eſpecially the Oil of Orris.

The Virtues of Oxymel, or of ſimple Vinegar, with Pepper, are ſufficiently evinc'd by *Chriſtophorus de Vega Art. Med. Lib. 3. Sect. 5. Cap. 8.* All Phyſicians are ſufficiently appriz'd, that Vinegar, moderately us'd, is a powerful Reſolvent, whilſt Pepper is an acrid Subſtance, equally proper to diſſolve the Coagulations of the Juices, and reanimate the Fibres, by the Irritation it produces in them. The Powder of Penny-royal is, alſo, an acrid Aromatic, whoſe Effect muſt of courſe be nearly the ſame with that of Pepper.

As for exciting a Vomiting in hang'd Perſons, I think it more dangerous than in thoſe who are drowned; for the Contractions of the Muſcles ſubſervient to Expiration, may ſerve to reſtore that Function, as we have already obſerv'd, ſince the Inflation of the Abdomen and Breaſt of hang'd Perſons is a Proof, that their Inſpiration is forc'd and unnatural; yet in ſuch Circumſtances it ſeems dangerous to convey a greater Quantity of Blood to the Head which is before overcharg'd with it, as is ſufficiently obvious, not only from the preceding Hiſtories, but alſo from the livid Colour of the Countenance. It is, however, certain, that the Shocks, given to the Parts by means of the Vomiting, are very

prope

proper to diſſolve the Coagulations of the Blood, though I would never adviſe the Uſe of this Method, till after a previous Veneſection.

The Topic mentioned above, which *Schenkius* orders to be applied to the Neck, may produce very happy Effects, by reſolving the Blood collected in the Skin and Muſcles of the Neck, and relaxing the Parts which had ſuffered moſt immediately by the Rope.

Geſner, for a Girl who hang'd herſelf, ſucceſſfully ordered Powder of Caſtor, which he forc'd down in warm Broth. This Remedy is alſo of a volatile and reſolvent Nature. *Joubert. in Lib. 4, de Effect. Thor. Cap.* 1. informs us, that he reſtored many hang'd Perſons to Life, without ſuch a Multiplicity of Expedients; ſince he uſed no other Method than Veneſection, and forcing into their Stomachs a due Quantity of good Wine.

Ranchinus in Tr. de Morb. ſubit. Cap. 12. orders Oil of Orris, or of Lillies, to be applied to the Necks of hang'd Perſons, whilſt their Mouths are to be gargariz'd with Syrup of Violets, diſſolved in warm Water, or Barley-water. He alſo preſcribes Vomiting, excited by a Feather, in order to enlarge the Paſſages more. The ſame Author alſo recommends Pepper and Penny-royal, either in Vinegar, Oxymel, Wine, or the *Aqua Cæleſtis*. But Veneſection is the Expedient on which he depends moſt for happy Effects. The Oil and Syrup are not only intended to procure a Relaxation; and as for the Gargariſm, it cannot be us'd till the hang'd Perſon is previouſly reſtored to Life. The Pepper, Penny-royal, and other Subſtances mentioned by him, are deſign'd to re-animate and reſtore the natural Heat.

Aelius in Tetrabibl. Serm. 8. *Cap.* 49. orders us to add to the Pepper and Vinegar Nettle-ſeeds, which are alſo of an highly acrid Nature. The ſame

Author affirms, that, when the Redneſs round the Neck of hang'd Perſons is diſſipated, they open their Eyes, and the Parts are relaxed. He is alſo of Opinion, that we ought not to ſpare Fomentations of the Neck, with warm Oils, Cerate, or Woollen Cloths.

Ranchinus, from other Authors, greatly extols a Remedy which moſt People will think as ſingular in itſelf as diſagreeable to the Perſon who adminiſters it. It conſiſts of blowing into the Mouth of hang'd Perſons, provided the Adminiſtrator has in his own Mouth a bruis'd Nutmeg, Cinnamon, Cloves, or Carraway-ſeeds. As it is certain, that theſe Aromatics produce no other Effect, than impregnating the Air with ſome volatile Parts, proper to reſtore the Motion of the Fluids, ſo 'tis equally certain, that the principal Efficacy of this Practice depends upon the *Blowing*, which in this Caſe muſt infallibly produce ſalutary Effects; as is obvious from the following Experiments, recorded in N°. 28. of the Philoſophical Tranſactions of the Royal Society of *London*.

Firſt then, Doctor *Croon*, Profeſſor of *Greſham-College*, in the Preſence of the Royal Society, ſtrangled a Pullet, in ſuch a Manner, as that it diſcovered no more Signs of Life; but, by afterwards blowing into the *Arteria Trachea*, he ſo effectually reſtor'd the Motions of the Lungs, that the Pullet returned to Life.

Secondly, Doctor *Walter Needham*, in the Preſence of Mr. *Boyle*, and other *Literati*, hang'd a Dog, till the Motion of his Heart was no longer to be perceived, after which he open'd the Abdomen of the Dog, and, blowing into the Thoracic Duct, reſtored the Motion of the Blood, upon which the Heart began to beat, and the Dog returned to Life.

Thirdly,

Thirdly, Doctor *Hook*, in the Preſence of the Royal Society, cut the Ribs, the Diaphragm, and Pericardium of a Dog, after which, making an Inciſion in the ſuperior Part of the *Trachea*, he introduced into it the Pipe of a Pair of Bellows; then he blow'd the Air into the Lungs, and the Dog returned to Life; but died when he ceaſed to blow: By which Expedient he made him live and die alternately, as long as the Company pleas'd.

A *fourth* Experiment is that of *Becker*, by which he reſtor'd a hang'd Dog to Life, by opening his Larynx, and blowing the Air into his Lungs, through the Inciſion made; ſo that the Practice, enjoined by *Ranchinus*, is by no Means to be neglected.

Upon the Whole, the firſt and fourth Experiments are abſolutely the ſame with the Practice recommended by that Author. Now, Why may not that, which has ſucceeded twice, ſucceed oftener? Though the other Experiments do not ſo directly prove the ſame Truth, yet it may be eaſily deduc'd from them; for from the ſecond it follows, that the Air is not only neceſſary to the Circulation, becauſe by dilating the Lungs it gives a free Paſſage to the Blood, from one Ventricle of the Heart to the other, but alſo is requiſite to keep the Blood in ſuch a State of Solution, as Circulation requires. Now, by blowing Air into the Lungs, we inflate their Veſicles, which is the firſt Advantage produced by Reſpiration; and the Air, by this Means inſinuating itſelf into the Blood, reſolves its Coagulation. By means of this Explication, 'tis eaſy to comprehend how Doctor *Hook*'s Experiment favours the Doctrine of *Ranchinus*.

From what has been ſaid, we may therefore conclude, Firſt, that Blowing in the Mouths of hang'd Perſons is a proper Method of reſtoring them to

Life;

Life: Secondly, That, if this Method does not ſucceed, we are to perform the Operation of *Bronchotomy*, and by that Means blow Air into their Lungs: *Thirdly*, That we ought not to be diſcouraged at ſome fruitleſs Attempts, becauſe a Practice, with which *Becker* did not ſucceed till the fifth Time, may perhaps, in other Circumſtances, not ſucceed till later: Fourthly, That we muſt not, at the ſame Time, neglect theſe other Means, which have a Tendency to reſtore the loſt Fluidity of the Blood: Fifthly, That, if Death does not ſucceed Strangulation, this is rather the Effect of the Stiffneſs of the Cartilages which compoſe the Larynx, or according to ſome, of the Slackneſs of the Rope, than of the eaſy Diſpoſition of the Blood to reſume its Fluidity: Sixthly, That it is highly probable, that an efficacious Method of reſtoring drown'd Perſons to Life would be, to inject Air into the Blood, by introducing a ſmall Pipe into ſome of the larger Veins, for that Purpoſe; For what Difference is there between making the Air enter the Blood by the Thoracic Duct, or by any other Part? The only Caution, which I think ought to be given, is, to make choice of thoſe Veins moſt contiguous to the Heart; ſo that for this very Reaſon, as well as for their Largeneſs, and the Facility of finding them, I judge the external Jugulars moſt proper for this Purpoſe.

Having already obſerved, that as the Cauſe of Death is the ſame in hang'd and drown'd Perſons, ſo the Meaſures, taken for the Relief of the one, may be alſo uſed for reſtoring the Lives of the others: We proceed to give ſome Hiſtories of Facts, which prove the Poſſibility of reſtoring ſuffocated People to Life.

Mr. *Falconet* then, a Gentleman of ſtrict Probity and Candour, told Dr. *Bruhier*, That his Father had

had a fool-hardy Coachman, who, falling into a Quarrel at *Lyons*, killed a Man, and, being apprehended on the Spot, was forthwith condemn'd to be hang'd, which Sentence was accordingly put in Execution. The Surgeons of the Town having obtained his Body, in order to make a Skeleton, brought it into a Surgery, where they left it upon a Table; but, when they came next Day to diſſect it, they were ſurprized to find the Man not only alive, but in good Health, and piſſing in the Chimney, for want, as he ſaid, of a Chamber-pot.

This Man had ſtood in no Need of Remedies, certainly, for no other Reaſon, but becauſe the Circulation of the Blood had not been ſo long ſuppreſſed, but that it could of its own Accord reſtore itſelf.

Oſwaldus Gabelchaverus relates, in one of his Obſervations quoted by *Schenkius*, the Hiſtory of a Merchant of the Name of *Landthtaler*, who was hang'd on a Tree for ſome Villanies he had committed: He hung for a whole Hour, and the Servants who had Orders to inter him, having cut the Rope, perceived, as they thought, ſome Marks of Life in him, upon which they put him in a Cart, convey'd him to a proper Place, and ſoon reſtored him to Life. He afterwards us'd to ſay, that he was ſenſible of no Pain in hanging, except in his Eyes, and the Extremities of his Toes. About eighteen Years after, however, he began to follow the ſame Practices, for which he had been hang'd before; but *Prince* Charles of *Aremburg* ordered him to be hang'd a ſecond Time, in ſuch a Manner, that he never returned to Life.

Cæſarienſis in Illuſtr. Mirac. Lib. 6. Cap. 24. relates the Hiſtory of a certain Robber, who had been hang'd a little before a Servant belonging to a Canon of *Cologne* happened to come up to the Gallows,

Gallows. The Servant, imagining there were still some Remains of Life left in him, cut the Rope, and restored him to Life, by some cold Water taken from an adjacent Rivulet. The Robber, in the mean time, gradually resuming his Strength, followed his Deliverer, who was going to the next Town, and, just as they were talking with each other, the Robber laid hold of the Bridle of the Servant's Horse, cried out aloud, that the Horse belonged to him, and swore that the Servant had robb'd him of him: This Debate having drawn together a large Concourse of People, their Indignation was so strongly moved against the Servant, that, without hearing what he had to say in his own Justification, they were determined to drag him to the Gallows from which he had lately cut down the Robber; but, luckily for the Servant, some Inhabitants of the neighbouring Town, seeing a Concourse of People going to the Gallows, which belonged in common to both Towns, came to see what the Matter was; then the Crowd suffering the Servant to speak, he related his Adventure, and the Manner in which the Robber had recompens'd his Service. The Robber, being at last known, was a second Time hung upon the same Gallows, in such a Manner as not to return to Life.

Though the Ground-work of the following History resembles the preceding, yet it differs from it in many Circumstances, the most considerable of which is, the long Time the Criminal continued hang'd.

A Miller near *Abbeville* in *France*, happening to go near the Place where a Robber had been hang'd the Day before, suspected that he was not dead. Compassion having induc'd him to satisfy his Suspicion, which was well founded, he cut him down, laid him in a Cart, convey'd him to his own House,

and

and used such effectual Means to restore him to Life, that in fifteen Days the Robber recovered perfect Health. The Miller upon this intended to give him a little Money, and take his Leave of him; but, delaying for some Time to put that Intention in Execution, he left him one *Sunday* alone in his House; the miserable Wretch, forgetting what he owed to his Deliverer, broke open a Cupboard, and carried off all the Plate and Ready Money he could find. The Miller, upon coming home, and finding his House robbed, easily concluded, that his Guest was the Person who had done it; accordingly the Miller, his two Sons, and a Cart-driver, pursuing the Robber, overtook him about a League off, and dragging him to the Gallows, whence he had been cut down, hung him up a second Time, and gave him such Shocks, that they put it out of his Power to commit any more Robberies. It is about forty Years since this Accident happen'd, and Doctor *Brubier* informs us, that it is attested by Persons of the best Reputation in *France*; and a Pardon was actually procured for the Miller, his Sons, and Servant, who took the Liberty of executing the Robber, without legal Authority.

Before we put an End to this Treatise, which we intend for the common Good and Benefit of Mankind, we shall say something with Respect to the Methods of preserving the Lives of Children, who appear dead when born. No two Abuses then are more prejudicial to Society, contrary to Humanity, or inconsistent with Reason, than to inter Women big with Child, without performing the *Cæsarian* Operation upon them; and, without any Attempts of Relief, totally to abandon Children who seem to be born dead.

The former of these Abuses is founded on two Errors; the first of which is, that the Infants do not survive their Mothers, when they die near their

Time; and the ſecond, that the Lives of Children depend abſolutely on thoſe of their Mothers. Now theſe two Errors are deſtroyed by ſeveral Hiſtories, which prove, that the Death of the Mother does not neceſſarily produce that of the Child.

Caſpar Reies, then, in his *Campus Elyſius Jucundarum Queſtionum*, relate from *Cornarius*, "That "a Woman of *Madrid*, of the illuſtrious Houſe "of *Laſſo*, being reputed dead, after remaining "three Days in the utmoſt Agonies, was put in- "to the Tomb belonging to the Family, which "being open'd ſome Months after, her Corps was "found with an Infant tenderly graſped in her "right Arm; for, continues the Author, the "Woman was pregnant, and near her Time, "when ſhe was interr'd as dead."

The following Hiſtory is alſo related, by the ſame Author, and atteſted by ſome of the moſt learned and judicious Men in *Spain*.

"The Wife of *Francis Arevallo de Svaſſo* fell "ill in the City of *Segovia*, during the laſt Months "of Geſtation: However, as ſhe died, or rather "was taken for dead, in a few Days ſhe was in- "terr'd, according to the Cuſtom of the Place. "The Huſband, in the mean Time, who was ſent "for to a Place at a conſiderable Diſtance, whi- "ther he had gone about ſome Buſineſs, came "home about the Middle of the Night, and being "informed that his Wife, whom he loved to Ex- "ceſs, was dead and buried, he would at any Rate "have the Satisfaction of ſeeing her once more: "For this Purpoſe, he went to the Church, and "order'd her to be raiſed from the Grave; hard- "ly was the Coffin open'd, till the Cries of an In- "fant were heard; the By-ſtanders were aſtoniſh- "ed, a Juſtice was called, the Prieſts, and a great "many others got Flambeaus, and attended the Huſband;

" Husband; the Shroud was lifted up immedi-
" ately, upon which appeared the Head of an In-
" fant, making a vigorous Effort to disengage the
" rest of its Body from the Vagina. This Infant
" was not only extracted sound, and alive, but al-
" so lived to be Lieutenant-General of the City of
" *Cherez*. The surprising Manner, in which he
" came into the World, laid a Foundation for his
" being called, *The Son of the Earth*.

From these Histories, *Caspar Reies* draws the following Consequences: " 'Tis evident that " Children don't die with their Mothers, when the " latter die near the Periods of their Deliveries. " *Sennertus* affirms, not only that they live for " some Time after their Mothers are dead, but " also that we may, and even ought, to extract " them alive from the Uterus. *Vincelius* has com-" pos'd two Treatises, in order to prove these " Truths, which are also sufficiently establish'd in " the Dissertations of *Nymman*, *De Vita Fœtus in* " *Utero*, where, as well as in other Authors, we " find a great many similar Histories; and others " of Women who have been deliver'd of live " Children after their own Death. The Reader " may also consult *Raynaud de Ortu Infantum contra* " *Naturam*. Hence 'tis obvious, that we ought " not to be too rash and precipitate in burying " pregnant Women who die near their Times. I " am not certain whether these Women were dead " or alive at the Time of their Interment, tho' it " appears evident from the Circumstances, that " the first was buried alive; for *Horstius* proves " from another Fact, that dead Women may be " deliver'd of Children. Thus he informs us that " a Woman big with Child, being hang'd along " with her Husband by the *Spanish* Soldiers, be-

" tween *Deventer* and *Zutphen*, was, four Hours " after her Death, deliver'd of five Twins."

Thomas Bartholin in *Act. Hafn. An.* 1673 relates an History which proves the same Truth, and which is, " That of a Child born two Days after the " Death of its Mother, which happen'd in a La- " bour, in which three Midwives had employ'd all " their Art and Skill. Thus 'tis certain from Ex- " perience, that dead Women may be deliver'd of " live Children, and this has perhaps laid a Foun- " dation for the whimsical and superstitious Prac- " tice of putting into the Coffins of Women, who " die big with Child, a Needle, a Thread, and a " Pair of Scissars, as if the Manes stood in Need of " those Instruments to tie and cut the umbilical " Chord of the Infant about to be born. In short " it has been observ'd, that Infants have been " born in the Coffins of their Mothers."

The same Author also mentions a Woman who in 1635, on *Thursday* about 9 o'Clock at Night, died of Epileptic Fits. On the *Friday* the Foam was discharg'd from her Mouth, Cries resembling those of an Infant were heard, and a sensible Motion was observ'd in the Abdomen of the Mother. On *Saturday* about 10 o'Clock in the Morning, the Woman discharg'd a great deal of Blood, so that, on changing her Linnen, her Infant, still warm, was found lying betwixt her Thighs. *Bartholin* adds, that the Physicians of the Town were of Opinion that the Mother had only died when her Mouth became full of Froth, without which Circumstance the Infant could not probably have liv'd.

In the *Miscellanea Naturæ Curios.* we have Instances of Women who have died near their Time, and been deliver'd sometimes of dead, sometimes of live Children, sometimes one, two, and three Days after their Deaths. These Instances are recorded

corded by *Reſler*, firſt Phyſician to the Prince of *Brieg* in *Obſ.* 318. *An.* 3. By *Poliſius* in *Obſ.* 42. *An.* 4. By *Doleus* in *Decur.* 2. *An.* 5. *Obſ.* 137. By *Hoyer* in *Decur.* 2. *An.* and laſtly by *Hartmanus* in *Obſervat.* 83. of the ſame Volume.

From what has been ſaid 'tis ſufficiently obvious, that thoſe Perſons are greatly miſtaken who ſuppoſe that the *Fœtus* does not ſurvive its Mother; for it is evinc'd from a Number of Obſervations, that the Life of the *Fœtus* is ſuſtain'd by a Circulation peculiar to itſelf; that the umbilical Arteries, which terminate in the Placenta, convey thither a Quantity of Blood, which is carried back by the umbilical Vein, without paſſing to the Mother; and that, if this Blood undergoes any Change, it is only from a lymphatic or lacteal Liquor, which the Roots of the Placenta imbibe from the uterine Veſſels. Theſe Truths are at preſent univerſally agreed upon; ſo that, before the Death of the Mother can deſtroy the Life of the Child, 'tis neceſſary to prove, Firſt, That the lacteal Liquor ceaſes to be filtrated immediately after the Death of the Mother: Secondly, That the Suppreſſion of this Filtration is an infallible, or even neceſſary Cauſe of Death. In Conſequence of this, we muſt prove, that, at every Circulation, the Juices of the *Fœtus* have their nutritive and vivifying Principles exhauſted; and that the *Fœtus* is incapable of ſuſtaining in the Uterus a Degree of Faſting, which it often ſupports for ſeveral Days after it is brought into the World. Now, as theſe Propoſitions cannot be proved, ſo it cannot be evinced, that the Death of the Mother is neceſſarily ſucceeded by that of the *Fœtus*; ſo that 'tis certain, we commit manifeſt Homicide, by interring pregnant Women near their Time, without performing the *Caſarian* Operation upon them.

This

This is no new Doctrine, ſince in the *Digeſt*, *Lib.* 4. *Tit.* 8. theſe Words occur: "A Royal Edict prohibits the Interment of dead pregnant "Women, before we have delivered them, by "Means of the *Cæſarian* Operation. Thoſe, who "do otherwiſe, appear to have deſtroyed with the "pregnant Woman the Hope of obtaining a living "Man." It is highly to be lamented, that this Law is not univerſally put in Execution, ſince it is a Principle founded on the eternal and unalterable Nature of Things, *That we kill thoſe whom we do not preſerve, when we have it in our Power.*

If it ſhould be objected, that this Operation would, if not always, yet at leaſt very often, prove an uſeleſs Attempt: I anſwer, that it is an eaſy Operation, ſince it is performed by two or three Strokes of the Biſtory, and a few Stitches of a Needle. Beſides, though Children after this Operation ſhould appear dead, yet we are not to truſt to thoſe Appearances, unleſs Putrefaction ſhould remove all Doubt.

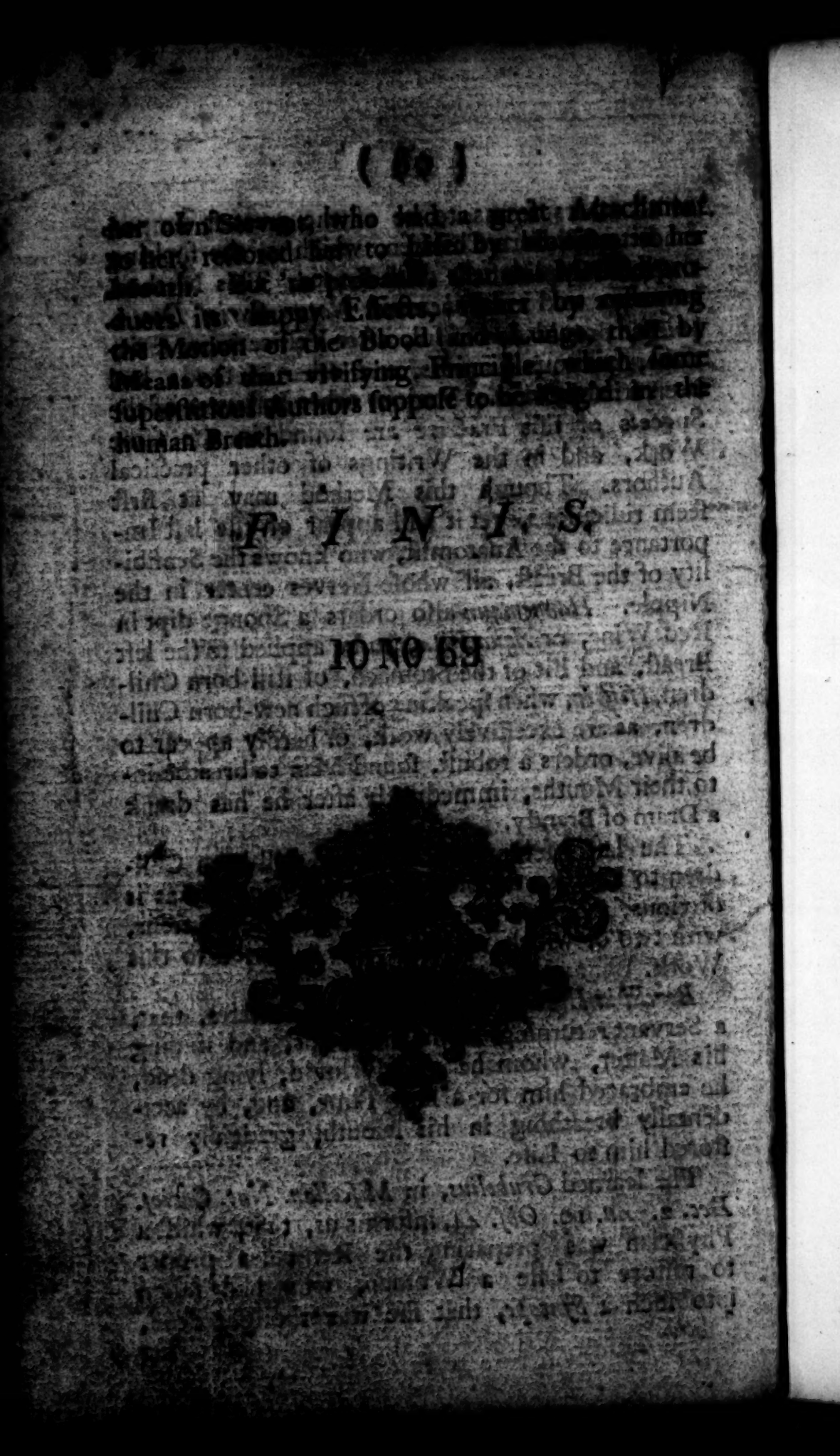
Bhonius informs us, that the Faculty of Medicine at *Wurtemburgh*, being conſulted in a criminal Proceſs rais'd againſt a Mother for killing her own Child, anſwered, that Children were ſometimes born ſo weak, as to appear for a conſiderable Time without Senſation, Motion, and Reſpiration; and that it was neceſſary to uſe Vellications, Fomentations, Aſperſions of Wine, Spirits of Wine, or *Aqua Vitæ*; as alſo to make them ſwallow aromatic Liquors, or blow ſpiritous Liquors into their Mouths and Noſtrils, till they begin to cry, which is an infallible Mark that the Air has entered the Lungs.

As to theſe Meaſures, we have before ſhewn, that they have an evident Tendency to reſtore Life. But we muſt not here paſs over a Practice, which,

of

of all others ſeems to be of the greateſt Importance to ſtill-born Children, which is, the ſucking the left Nipple of the dead Fœtus. This Method, as we are told in *Ephemerid. Natur. Curioſ. Dec.* 2. *An.* 5, prov'd ſucceſsful, after Vellications, Frictions, ſpiritous Liquors, and other Methods had been tried in vain. Various other Inſtances of the Succeſs of this Practice are found in the ſame Work, and in the Writings of other practical Authors. Though this Method may at firſt ſeem ridiculous, yet it will appear of the laſt Importance to the Anatomiſt, who knows the Senſibility of the Breaſt, all whoſe Nerves center in the Nipple. *Hannemann* alſo orders a Sponge dipt in Red Wine, or *Aqua Vitæ*, to be applied to the left Breaſt, and Pit of the Stomach, of ſtill-born Children. *Heiſter*, when ſpeaking of ſuch new-born Children, as are exceſſively weak, or hardly appear to be alive, orders a robuſt, ſound Man to breathe into their Mouths, immediately after he has drank a Dram of Brandy.

The laſt Method of reſtoring ſtill-born Children to Life is, to blow into their Mouths, as is obvious, from various well-atteſted Obſervations, with two of which we ſhall put a Period to this Work.

Borelli in Hiſt. Cent. 3. *Obſerv.* 58. relates, that, a Servant returning from the Fields, and finding his Maſter, whom he greatly lov'd, lying dead, he embraced him for a long Time, and, by accidentally breathing in his Mouth, gradually reſtored him to Life.

The learned *Grubelius*, in *Miſcellan. Nat. Curioſ. Dec.* 2. *An.* 10. *Obſ.* 44. informs us, that, whilſt a Phyſician was preparing the Remedies proper to reſtore to Life a Woman, who had fallen into ſuch a *Syncope*, that ſhe was thought dead, her